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An Enumeration of the Hepaticae Collected by John B. Hatcher in Southern Patagonia.

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(PLATES 345-348.)

The territory of Patagonia, and particularly the regions neighboring the Straits of Magellan, have several times been visited by scientific expeditions. Most of these have made collections of Patagonian plants and have included the hepaticae among them, either incidentally or systematically. Our knowledge of the hepatic flora of this remote country is, therefore, sufficient to give us some idea of its exceeding richness and variety. Although a few of the most conspicuous species were gathered in the first years of the present century and even earlier, the real foundations of our knowledge are based on the collections made during the Antarctic voyage of the British ships *Erebus* and *Terror*, in the years 1839–43. These important collections were studied by Sir Joseph D. Hooker and Dr. Thomas Taylor, and their preliminary account* of the species found was later amplified into a fuller description† accompanied by numerous colored figures.

Passing over several smaller gatherings attention may further be called to three larger collections, which have been made and described within recent years. The first of these collections was that of Dr. Spegazzini, which was made in 1882 and included 103 species, most of which came from Fuegia. The determinations

* Hepaticae Antarcticae; being characters and brief descriptions of the Hepaticae discovered in the southern circumpolar regions during the voyage of H. M. Discovery Ships Erebus and Terror. Lond. Jour. of Bot. 3: 366–400, 454–481. 1844.

† Flora Antartica, 2: 423–446. *pl. 156–161.* 1847.

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were by Prof. Massalongo, of Ferrara, who published an illustrated account* of the species collected, describing 27 as new. The second collection was made under the direction of the French "Mission Scientifique du Cap Horn," and was studied by M. Bescherelle, of Paris, and Prof. Massalongo. A preliminary paper† by these writers described the new species and varieties, and their memoir,‡ published a little later, gave a complete enumeration of the plants in the collection with illustrations of many interesting forms. In their list, which includes a number of species found by Dr. Savatier on the western coast of Patagonia, we find 88 species, of which 12 are considered new. The third collection was made by Dr. Naumann during the voyage of the German ship, the *Gazelle*.

Although collected in the years 1875 and 1876, the account of these hepaticae was not published until 1890. They were first studied by Dr. Gottsche, of Altona, who made drawings of the various species collected. He also began but did not finish the work of description, and his notes were afterwards revised and completed by Dr. Schiffner, of Prague, who made use of many of Gottsche's figures in the published account§ of the collection. 69 species from the Straits of Magellan are included in this enumeration, and, of these, 16 are described as new.

The present report is based on a collection made by Dr. John B. Hatcher in the years 1896 and 1897, while engaged in geological field work for Princeton University. Nearly all the plants were found either at Lapotaia on the southern coast of Fuegia or at Villarina Bay, about a day's journey to the westward of Lapotaia, both stations being situated on the Beagle Channel. A very few species came from the Cordilleras of Patagonia. The collection, which numbers 53 species, includes few novelties, but is of interest in adding to our knowledge of certain rare and incompletely known forms.

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*Epatiche della Terra del Fuoco raccolte nell'anno 1882 dal Dott. C. Spegazzini. Nuovo Giorn. Bot. Ital. 17: 201–277. *pl. 12–28*. 1885.

†Hepaticae novae americanae-australes. Bull. de la Soc. Linn. 626–632, 637–640. 1886.

‡Hépatiques récoltées par la Mission francaise du Cap Horn au 1882 et 1883. Comptes rendus de la Mission Scientifique du Cap Horn, 5: 201–252. *pl. 1–5*. 1889.

§Lebermoose (Hepaticae) gesammelt auf der Reise S. M. S. Gazelle vorzüglich in der Magellan-Strasse, auf der Malayischen Inseln und Kerguelen-Land, 1–48. *pl. 1–8*. 1890.

In the preparation of this paper I am especially indebted to Dr. B. L. Robinson for allowing me access to the Taylor Herbarium, to Herr Stephani for helpful notes, drawings and specimens, and to Prof. Nathorst for the loan of two of Ångström's types. Other correspondents who have given me assistance will be mentioned under particular species.

1. ADELOCOLEA UNCIFORMIS (Hook f. & Tayl.).

Jungermannia unciformis Hook. f. & Tayl. Lond. Jour. Bot. **3**: 457. 1844.

Plagiochila unciformis Hook. f. & Tayl. in G. L. & N. Syn. Hep. 653. 1847.

Adelanthus unciformis Spruce, Jour. Bot. **5**: 200. 1876.

Plagiochila sphalera Hook. f. & Tayl. in G. L. & N. Syn. Hep. 653. 1847.

Jungermannia haliotiphylla De Not. Mem. Acc. Tor. II., **16**: 217. *f. 5.* 1857.

Adelanthus Lindenbergianus (Lehm.) Mitt. Jour. Linn. Soc. **7**: 244. 1864.

Lapotaia.

As Mitten * has already pointed out, there is a genus *Adelanthus* older than his own. It is the *Adelanthus* of Endlicher, which is now regarded as a synonym of *Pyrenacantha* Wight. Mitten suggests that the name "*Adelocolea*" be substituted for his *Adelanthus* but makes the change in only one species, viz., *Adelocolea decipiens* (Hook.) Mitt.

2. ANDROCRYPHIA PORPHYRORRHIZA Nees in G. L. & N. Syn. Hep. 470. 1846.

Jungermannia porphyrorrhiza Nees in Mart. Fl. Bras. **1**[1]: 343. 1833.

Noteroclada porphyrorrhiza Mitt. Bot. of Kerguelen Island: Transit of Venus Exped. 37. 1874.

Jungermannia confluens Hook. f. & Tayl., Lond. Journ. Bot. **3**: 478. 1844.

Androcryphia confluens Nees in G. L. & N. Syn. Hep. 471. 1846.

* Challenger Exped., Bot. **1**[2]: 106. 1884.

Villarina Bay.

In Hooker and Taylor's Hepaticae Antarcticae, the authors did not divide the old genus *Jungermannia* into distinct genera, but simply into subgenera and the name *Noteroclada* was given to one of these. Two years afterwards, in the Synopsis Hepaticarum, Nees von Esenbeck raised the group to generic rank, but, instead of retaining for it the name *Noteroclada*, substituted the name *Androcryphia*. The latter, therefore, is the oldest for the group as a genus and ought to be retained.

3. ANEURA CALVA Schiffn. & Gottsche, Lebermoose der Forschungsreise S. M. S. "Gazelle," 42. *pl. 8. f. 16.* 1890.

Fuegia.

4. ANEURA CRISPA (Schiffn. & Gottsche) Steph. Hedwigia **32**: 137. 1893.

Pseudoneura crispa Schiffn. & Gottsche, Lebermoose der Forschungsreise S. M. S. "Gazelle," 41. *pl. 8. f. 14, 15.* 1890.

Fuegia.

The specimens agree with a part of the type-material, kindly sent me by Professor Schiffner.

5. ANEURA FUEGIENSIS (Massal.) Evans, Contr. U. S. Nat. Herb. **1**: 142. 1892.

Riccardia Fuegiensis Massal. Nuovo Gior. Bot. Ital. **17**: 255. *pl. 26. f. 34.* 1885.

Lapotaia.

6. ANEURA PREHENSILIS (Hook. f. & Tayl.). Not Mitt. in Hook. f. Handb. N. Zeal. Fl. 543. 1867.

Jungermannia prehensilis Hook. f. & Tayl. Lond. Jour. Bot. **3**: 480. 1844.

Metzgeria prehensilis Hook. f. & Tayl. in G. L. & N. Syn. Hep. 505. 1846.

Acrostolia prehensilis Trevis. Mem. reale Ist. Lomb. di Sci. e Lett. III. **4**: 431. 1877.

Riccardia prehensilis Massal. Nuovo Gior. Bot. Ital. **17**: 255. 1885.

Aneura Savatieri Steph. Hedwigia **32**: 26. 1893.

Villarina Bay.

There has been so much confusion regarding this characteristic plant of southern Patagonia that it seems wise to give a brief review of the literature concerning it and to emphasize again its most important peculiarities. The original description of *Jungermannia prehensilis* (like all in Hooker and Taylor's paper) consists of two parts—a diagnosis in Latin, and a somewhat fuller account in English with comparative remarks. In the Synopsis Hepaticarum we find the diagnosis simply repeated and the English account translated into Latin, so that this description contains nothing new and is essentially like the original. In the Flora Antarctica again, what is practically the same description reappears but this time is supplemented by a figure of the plant with slightly enlarged details. This original description is, of course, incomplete and the part which applies to the vegetative characters of the plant, particularly so. The following extracts include all the points brought forward about the thallus: "Fronde laxe caespitosa erecta incurva alata; lobis alternis secundis pinnatis, pinnulis planis linearibus crassinerviis;" "Frondes loosely tufted, with broad hooked tips, the stem flat, brown, pubescent, the pinnules are smoother and of a pale olive green." The plant is compared with *Jungermannia eriocaula* Hook., which is said to be darker green and to have a tripinnate frond with narrower pinnules. Only one station is given, Hermite Island, Cape Horn, and no others are mentioned either in the Synopsis or in the Flora Antarctica.

In the Flora Novae Zelandiae, Mitten * applies the name *Sarcomitrium prehensile* (changed to *Aneura prehensilis* in the Handbook) to a plant with *smooth* epidermis, and apparently considers it identical with the Fuegian species. With the exception of this character, his description does indeed agree very closely with that of Hooker and Taylor. Massalongo, on the other hand, says of his *Riccardia prehensilis:* "Cellulae superficiales thalli in appendicem mamillaeformem pulcherrime prominent, "and Schiffner calls attention to the same peculiarity. Still more recently Stephani, basing his opinion on New Zealand specimens of *Aneura prehensilis* presumably determined by Mitten, describes a Patagonian plant as *Aneura Savatieri* n. sp. and names as his type some of the material referred by Bescherelle and Massalongo to

*Op. cit. 2: 167. 1855.

Riccardia prehensilis. His description is very clear, the account of the epidermis being as follows: "Cellulae * * * corticales depresso-imbricatulae, *i. e.*, apex cellulae papulosae supra cellulam proximam parum protractus; margo ubique hyalino subcrenulato." He remarks further: "*Aneura prehensilis* (ex insula N. Zelandia) multo robustior est, epidermide *plano-cellulosa.*"

In view of these conflicting opinions, I have consulted Taylor's original specimens of *Jungermannia prehensilis* from Hermite Island. They are remarkably free from admixture and show the peculiar papillose epidermis described above, indicating that the Patagonian plant is to be looked upon as the true *Aneura prehensilis* (Hook. f. & Tayl.). The New Zealand plant with the smooth epidermis is probably an unnamed species.

The papilliform epidermal cells of *Aneura prehensilis* are somewhat variable in their distribution; on some stems they occur on both surfaces, on others, only on the antical surface, while on the pinnules they are scattered and sometimes few in number. A robust rachis is about 15 cells thick, but its cells are unlike those found in most members of the genus; on the outside there are one or two layers of rather thin-walled cells (including the epidermis) and just inside these are two or three layers of cells with very thick brown walls, the thickening being deposited unequally and leaving irregular cell-cavities; the interior is filled with cells having slightly thickened pale walls. These different kinds of cells do not vary markedly in size.

The nearest ally of *Aneura prehensilis* is the more robust *A. eriocaula* of New Zealand. In this species the rachis, as described by Leitgeb,* is essentially like that of the Patagonian plant. The epidermis also shows papilliform cells, but the papillae, instead of being appressed, stand out from the rachis at right angles and give it a hirsute appearance.

7. ANEURA SPEGAZZINIANA (Massal.) Steph. Hedwigia **32**: 138. 1893.

Riccardia Spegazziniana Massal. Nuovo Gior. Bot. Ital. **17**: 254. *pl. 25. f. 32.* 1885.

Fuegia.

*Unters. über die Leberm. 3: 49. 1877.

8. ANTHOCEROS ENDIVIAEFOLIUS Mont. Voy. au Pôle Sud. Bot. Crypt. **1**: 211. 1845.

Lapotaia.

The plants referred to this species agree closely with the detailed description of Massalongo * as well as with the more meager original description of Montagne. In the Taylor Herbarium, there is an *Anthoceros* from Cape Horn, labeled *A. punctatus* which belongs here, and, judging from the description, *A Jamesonii* Tayl.† is also to be considered a synonym.

9. BLEPHARIDOPHYLLUM DENSIFOLIUM (Hook.) Ångstr. Öfversigt af Kongl. Vetensk.-Akad. Förhand. **29**, Häft 5: 151. 1874.

Jungermannia densifolia Hook. Musc. Exot. *pl. 36.* 1818.

Scapania densifolia Nees in G. L. & N. Syn. Hep. 72. 1844.

Diplophyllum densifolium Mitt. Jour. Linn. Soc. **15**: 69. 1875.

Martinellia densifolia Trev. Mem. reale Ist. Lomb. di Sci. e Lett. III. **4**: 411. 1877.

Villarina Bay.

A very variable species, including *Jungermannia vertebralis* Hook. f. & Tayl., *J. chloroleuca* Hook. f. & Tayl. and *J. pycnophylla* De Not.

10. BLEPHAROSTOMA PILOSUM sp. nov.

Sterile: densely caespitose, brownish-green; stems erect, simple or with a few lateral branches, sparingly or not at all radiculose, the rhizoids, when present, coming from the basal cells of the underleaves; leaves and underleaves similar, transversely inserted, concave, broadly orbicular-quadrate in general outline, deeply 4-parted (about $\frac{4}{5}$), the segments lanceolate, 4–7 cells wide at base, tapering into capillary points (each composed of a single row of 5 or more cells), and bearing on their margins 5–8 pairs of opposite widely divaricate capillary teeth, becoming successively longer toward the base; upper teeth composed of a single row of cells, lower teeth strongly deflexed, often 2 cells wide in the lower part and giving off a pair or two of tertiary teeth, the external basal teeth of the outer segments much larger than the others and making the leaves appear 6-parted; undivided basal part of the leaves about 4 cells across: leaves subtending branches similar to

* Nuovo Gior. Bot. Ital. **17**: 258. 1885.

† Fl. N. Zeal. **2**: 171. 1855.

the others but only 2-parted (though often apparently 4-parted from the large size of the external basal teeth of the segments): leaf-cells oblong, rather thick-walled but without trigones; cuticle often indistinctly and minutely verruculose-striate, especially toward the base of the leaves.

Stems 1–2 cm. long, 0.2 mm. wide; leaves 0.85 mm. long and wide, leaf-cells averaging 46 μ long, 14 μ wide. [Plate 345, figs. 1–6.]

Villarina Bay.

The leaves of the present species are so copiously and finely dissected that the plant reminds one at first glance of a *Trichocolea*, but the scanty branching, the dark color and the occasional rhizoids would seem to remove it from that genus. The somewhat problematical *T. polyacantha* (Hook. f. & Tayl.) from New Zealand might, nevertheless, seem from the published descriptions and figures* to be identical with our species, but a study of the type material in the Taylor Herbarium shows conclusively that this curious plant is distinct not only from *Blepharostoma pilosum* but also from *B. quadripartitum* (Hook.) Trevis., of which Schiffner† has considered it a possible synonym. The New Zealand species is distinguished at once by the numerous paraphylla which clothe the stem and give it a hirsute appearance; they are minute structures, composed of only 2–4 cells and are either simple or forked, their cells, like those of the leaves, being minutely verruculose. Whether the plant is really a *Trichocolea* or not can hardly be settled without a larger supply of material, as the true nature of the involucre cannot be made out without dissection.

In the remarks which supplement Mr. Pearson's description of *Blepharostoma palmatum* Lindb.,‡ a statement is made which would seem to indicate that *B. pilosum* (or some closely allied plant) has sometimes been included under *B. quadripartitum*. The specimens listed below agree closely with authentic specimens of this latter species in the Taylor Herbarium and also with a drawing in the Sullivant collection made from material collected on the Wilkes Expedition. The main differences between the two are the following: *B. quadripartitum* is smaller than *B. pilosum*, and its

* Lond. Jour. Bot. 3: 290. 1844. Fl. Ant. 1: 161. *pl. 65. f. 9.* 1844.

† Lebermoose der Forschungsreise S. M. S. "Gazelle," 19. 1890.

‡ Jour. Bot. 25: 193–195. *pl. 275.* 1887.

smaller leaves are less deeply parted (about ⅔), the undivided basal part being about 6 cells across; the leaf-cells are shorter; the leaf-segments are either entire (on slender branches) or sparingly toothed, there being only 1–3 pairs of teeth for each segment, except on the leaf-margins, where there may be 1 or 2 extra ones; the teeth are always short and simple; even on the bracts, where the teeth of the segments are often 6–8 in number on each side, they remain short, rarely being more than 3 or 4 cells in length.

11. BLEPHAROSTOMA QUADRIPARTITUM (Hook.) Trevis. Mem. reale Ist. Lomb. di Sci. e Lett. III. **4**: 417. 1877. [Plate 345, figs. 7, 8.]

Jungermannia quadripartita Hook. Musc. Exot. *pl. 117.* 1820.

Temnomia quadripartita Mitt. Jour. Linn. Soc. **15**: 68. 1877.

Jungermannia podophylla Ångstr. Öfversigt af Kongl. Vetensk.-Akad. Förhand. **29**, Häft 4: 11. 1872 (*fide* Pearson).

Fuegia.

12. CHILOSCYPHUS MASSALONGOANUS Steph. Hedwigia, **32**: 325: 1893.

Chiloscyphus fissistipus Massal. Nuovo Gior. Bot. Ital. **17**: 229. *pl. 18. f. 16.* 1885. (Not Hook. f. & Tayl).

Chiloscyphus fissistipus var. *Magellanicus* Schiffn. & Gottsche, Lebermoose der Forschungsreise S. M. S. "Gazelle," 14. *pl. 2. f. 18.* 1890.

Villarina Bay.

13. FOSSOMBRONIA NAUMANII Schiffn. & Gottsche, Lebermoose der Forschungsreise S. M. S. "Gazelle," 39, *pl. 7. f. 23–25.* 1890.

Fuegia.

The present material is all sterile and can only be referred provisionally to the above species, from which it differs in certain points. Professor Schiffner has kindly compared the Patagonian plant with the type of *F. Naumanii* from Kerguelen Island and writes me the following note in regard to it: "Differt a *F. Naumanii* statura majore, rhizoidis pallidis (nec violaceo-rubris), absentia squamu-

larum dorsalium. Foliorum forma et reticulatione bene congruit. Aeque ac *F. Naumanii* planta aquatica vel imo palustris esse videtur." In the total absence of reproductive organs it seems wisest not to give our plant a new name.

14. FRULLANIA BOVEANA Massal. Nuovo Gior. Bot. Ital. **17**: 244. *pl. 23. f. 27.* 1885.

Fuegia.

15. HARIOTIELLA HERMITENSIS Massal. & Besch. Nuovo Gior. Bot. Ital. **5**: 256. 1898 (new series).

Polyotus? Hariotianus Besch. & Massal. Bull. Soc. Linn. de Paris, 639. 1886.

Lepidolaena Hariotiana Schiffn. in Engler & Prantl, Nat. Pfl. Fam. **I**^{3}: 110. 1895.

Lapotaia.

16. HARPALEJEUNEA SUBFENESTRATA (Massal.) Schiffn. & Gottsche, Lebermoose der Forschungsreise S. M. S. "Gazelle," 28. *pl. 6. f. 10, 11.* 1890.

Lejeunea subfenestrata Massal. Nuovo Gior. Bot. Ital. **17**: 249. *pl. 25. f. 30.* 1885.

Villarina Bay.

17. JAMESONIELLA COLORATA (Lehm.) Schiffn. in Engler & Prantl, Nat. Pfl. Fam. **I**^{3}: 83. 1893.

Jungermannia colorata Lehm. Linnaea, **4**: 366. 1829.

Villarina Bay.

18. JUNGERMANNIA ANTARCTICA Ångstr. Öfversigt. af Kongl. Vetensk. Akad. Förhand. **29**, Häft 4: 10. 1872.

Jungermannia Pigafettoana Massal. Nuovo Gior. Bot. Ital. **17**: 217. *pl. 14.* 1885.

Lapotaia.

Through the kindness of Professor Nathorst, of Stockholm, I have been enabled to examine a part of Ångström's type of this species, which is preserved in the collections of the Royal Academy of Science; the specimens agree in all respects with those collected by Dr. Hatcher and also with the published description and

figures of *Jungermannia Pigafettoana*. The original description of Ångström does not give an accurate account of the underleaves. In the diagnosis of the species, we read: "amphigastria ovato-vel lanceolato-subulatis;" and, in the fuller description which follows, it is stated: "amphigastria caulis inferioris ovato-subulata, utrinque in parte basali et sub subulam dente uno subulato instructa; in parte superiori caulis lanceolato-subulato subintegra sunt." As a matter of fact, the underleaves are deeply 2-parted, and the description quoted above applies to the divisions and not to the complete structures. Ångström also omits mention of the cuticle of the leaves, which is strongly verrucose, and is one of the most striking peculiarities of the plant.

19. JUNGERMANNIA HATCHERI sp. nov.

Jungermannia barbata, B. Floerkii Gottsche, Die Lebermoose Süd-Georgiens, 450. *pl. 6.* 1890. Not *Jungermannia Floerkii* Web. and Mohr.

Sterile: plants loosely caespitose or creeping over tufts of *Lophocolea rigens*, yellowish-brown; stems simple or sparingly branched, densely radiculose; leaves closely imbricated, obliquely inserted, more or less crispate, broadly quadrate; abruptly widening from the base, not decurrent, cleft one-third or more into 4 obtuse, acute or cuspidate lobes, separated by obtuse or lunulate sinuses, postical margin bearing near the base a cluster of 2–5 fine hair-like cilia, each consisting of 2–8 cells, usually in a single row; underleaves divided almost to the base into 2 slender divisions, bearing cilia in the lower part; leaf-cells rather thin-walled with distinct trigones, cuticle smooth or nearly so; gemmae reddish-brown, borne in chains and forming clusters on the teeth of the upper leaves, angular, composed of 1 or 2 cells.

Stems .5–1 cm. long, 0.35 mm. in diameter; leaves 1.55 mm. long, 1.20 mm. wide; underleaves 0.55 mm. long, 0.15 mm. wide; leaf-cells on margin 15 μ, in the middle 19 μ, and at the base 23 μ in diameter; gemmae 15 μ in diameter. [Plate 346, figs. 1–7.]

Lapotaia.

The present species is an antarctic representative of the *barbatae*-group of the genus *Jungermannia*, a group of closely allied plants, which forms a most conspicuous feature of the hepatic floras of northern and arctic regions. The presence of basal cilia on the leaves shows an approach to *J. lycopodioides* and *J. Floerkii*, and to

the latter species the Patagonian plant bears a marked resemblance. The principal points of difference have already been indicated by Gottsche. In *J. Floerkii*, the leaves do not broaden out so abruptly from the base as in *J. Hatcheri*, their lateral margins are more nearly parallel and their more robust basal cilia are often 2 or 3 cells wide in the lower part; the underleaves are much larger and their segments are often 8–10 cells broad at the base instead of only 3 or 4 cells; in *J. Hatcheri*, moreover, the segments end in a single row of 10–20 cells, whereas in *J. Floerkii*, there are usually less than 10 cells. The occasional cuspidate leaf-lobes of *J. Hatcheri* remind one of the similar structures found in *J. lycopodioides*, but this latter species is much more robust, and has longer and more tortuous basal cilia and larger underleaves with broader and more densely ciliated segments.

20. JUNGERMANNIA PROPAGULIFERA Gottsche Die Lebermoose Süd Georgiens, 451, *pl. 1. f. 6–12*. 1890. [Plate 346, figs. 8–18.]

Paroicous: plants caespitose, mixed with the preceding species, yellowish-brown or reddish; stems creeping or ascending, branching by innovations, radiculose: leaves imbricated, ovate-quadrate, obliquely spreading, not decurrent, concave, bifid about one third with subacute sinus and lobes, the antical lobe slightly smaller, otherwise entire (or erose-denticulate from the presence of gemmae); underleaves wanting; leaf-cells polygonal in outline, thin-walled and without trigones; ♀ inflorescence terminal; bracts in 1 or 2 pairs, mostly erect-spreading, similar to the stem-leaves but more crispate, sometimes trifid and with sparingly and irregularly toothed lobes and margins; bracteole connate on one or both sides, with bracts ovate, bilobed or not segmented, toothed or entire; perianth ovate-cylindrical, composed of a single layer of cells, slightly narrowed and plicate in the upper part, minutely denticulate at the mouth: ♂ bracts in 2–4 pairs, situated just below the ♀ bracts, complicate-bilobed, but similar to the stem-leaves when spread out, scarcely inflated at the base and enclosing 1 or 2 antheridia; gemmae borne on the leaves near the apices of the lobes, yellowish-brown, oblong, composed of 1 or 2 cells: capsule spherical, purple, borne on a long hyaline stalk; spores yellowish-brown, minutely tuberculate; elaters reddish, bispiral.

Stems .5–1 cm. long, 0.22 mm. in diameter; leaves 0.95 mm. long and wide; leaf-cells 28 μ in diameter at base, 22 μ in other parts of the leaf; bracts 1.2–1.35 mm. long, 0.85–1.2 mm. wide, bracteole 1.0–1.1 mm. long, 0.5 mm. wide, perianth 2.9 mm. long,

1.1 mm. in diameter; gemmae 20 μ in diameter; spores 12–14 μ in diameter.

Lapotaia.

In his description of *Jungermannia propagulifera*, Gottsche calls attention to the peculiarities of the perigonial bracts and the gemmiparous stems, but says that the perichaetial bracts with the female flowers are still to be desired, thereby implying that the species is dioicous. In other respects the description agrees very closely with the plants collected by Dr. Hatcher, and it seems best to refer the latter's specimens, provisionally at any rate, to Gottsche's species. Curiously enough, both the South Georgian and the Fuegian specimens were found growing with *Jungermannia Hatcheri*. *J. propagulifera* is nearly allied to the European *J. socia* Nees, which certain authors* consider a variety of *J. excisa* Dicks. It resembles this species in its paroicous inflorescence, in its absence of underleaves, etc. In the European species, however, the leaves are less deeply bifid, so that the sinus is obtuse or lunulate, the leaf-cells have thicker walls and there are slight differences in the bracts.

21. LEJEUNEA SAVATIERIANA Besch. & Massal. Bull. Soc. Linn. de Paris, 638. 1886.

Harpalejeunea Savatieriana Schiffn. & Gottsche, Lebermoose der Forschungsreise S. M. S. "Gazelle," 29. *pl. 6. f. 7.* 1890.

Villarina Bay.

22. LEPICOLEA OCHROLEUCA (Spreng.) Lindb. Acta Soc. Sci. Fenn. **10**: 516. 1875.

Jungermannia ochroleuca Spreng. Syst. Veg. **4**: 325. 1829.

Sendtnera ochroleuca Nees in G. L. & N. Syn. Hep. 240. 1845.

Leperoma ochroleuca Mitt. in Hook. f. Handb. of the N. Zeal. Fl. 754. 1867.

Herberta ochroleuca Trevis. Mem. reale Ist. Lomb. di Sci. e Lett. III. **4**: 397. 1877.

Villarina Bay, etc.

* Cf. Massalongo, Atti della Soc. Veneto-Trent. di Sc. Nat. II. **2**:(19). 1895.

23. LEPIDOLAENA MAGELLANICA (Lam.) Lindb. Jour. Linn. Soc. **13**: 194. 1873.

Jungermannia Magellanica Lam. Encycl. Bot. **3**: 284.

Polyotus Magellanicus Gottsche in G. L. & N. Syn. Hep. 248. 1845.

Gackströmia Magellanica Trevis. Mem. reale Ist. Lomb. di Sci. e Lett. III. **4**: 397. 1877.

Fuegia.

24. LEPIDOLAENA MENZIESII (Hook.) Dumort. Recueil d'obs. sur les Jung. 13. 1835.

Jungermannia Menziesii Hook. Musc. Exot. *pl. 118.* 1820.

Polyotus Menziesii Gottsche in G. L. & N. Syn. Hep. 247. 1845.

Fuegia.

25. LEPIDOZIA FILAMENTOSA Lehm. & Lindenb. in G. L. & N. Syn. Hep. 207. 1845.

Jungermannia filamentosa Lehm. & Lindenb. in Lehm. Pugillus, **4**: 29. 1832.

Mastigophora filamentosa Trevis. Mem. reale Ist. Lomb. di Sci. e Lett. III. **4**: 416. 1877.

Villarina Bay.

26. LEPIDOZIA PLUMULOSA Lehm. & Lindenb. in G. L. & N. Syn. Hep. 211. 1845.

Jungermannia plumulosa Lehm. & Lindenb. in Lehm. Pugillus, **6**: 30. 1834.

Mastigophora plumulosa Trevis. Mem. reale Ist. Lomb. di Sci. e Lett. III. **4**: 416. 1877.

Lepidozia tetradactyla Tayl. in G. L. & N. Syn. Hep. 213. 1845.

Jungermannia tetradactyla Hook. f. & Tayl. Lond. Jour. Bot. **3**: 306. 1844.

Fuegia.

27. LEPIDOZIA TRUNCATELLA Nees in G. L. & N. Syn. Hep. 209. 1845.

Mastigophora truncatella Trevis. Mem. reale Ist. Lomb. di Sci. e Lett. III. **4**: 416. 1877.

Fuegia.

28. LOPHOCOLEA BIDENTATA (L.) Dumort. Recueil d'obs. sur les Jung. 17. 1835.

Lapotaia.

29. LOPHOCOLEA STENOPHYLLA Schiffn. & Gottsche, Lebermoose der Forschungsreise S. M. S. Gazelle, 12. *pl. 3. f. 25–28.* 1890.

Villarina Bay.

30. LOPHOCOLEA HORIZONTALIS (Hook.).

Jungermannia horizontalis Hook. Musc. Exot. *pl. 96.* 1818.

Chiloscyphus horizontalis Nees in G. L. & N. Syn. Hep. 177. 1845.

Jungermannia grandifolia Hook. f. & Tayl. Lond. Jour. Bot. **3**: 474. 1844.

Chiloscyphus grandifolius Tayl. in G. L. & N. Syn. Hep. 185. 1845.

Villarina Bay.

31. LOPHOCOLEA LENTA (Hook. f. & Tayl.) Tayl. in G. L. & N. Syn. Hep. 162. 1845.

Jungermannia lenta Hook. f. & Tayl. Lond. Jour. Bot. **3**: 379. 1844.

Jungermannia diademata Hook. f. & Tayl. *l. c.* **3**: 560. 1844.

Jungermannia secundifolia Hook. f. & Tayl. *l. c.* **3**: 471. 1844.

Lapotaia.

32. LOPHOCOLEA OBVOLUTA (Hook. f. & Tayl.).

Jungermannia obvoluta Hook. f. & Tayl. Lond. Jour. Bot. **4**: 80. 1845.

Fuegia.

In the original description of this species no station is given except the Falkland Islands. In the Flora Antarctica, Hermite Island, Cape Horn, is also mentioned. Under the name *Jungermannia obvoluta*, two plants are preserved in the Taylor herbarium; the first of these from the Falkland Islands, must be considered the type of the species; the second from Cape Horn, is appar-

ently distinct, but there is so little of it that it would be unwise to attempt to describe it. In the type-specimen a well-developed leaf is almost longitudinally inserted and is attached by a very broad base, the distance from side to side being about twice as great as that from base to apex. The leaf is more or less distinctly divided into two unequal lobes; the postical, which is slightly the larger, is concave and rounded at the base and extends beyond the stem, at the apex it is bidentate but is otherwise entire; the antical lobe is decurrent and is irregularly lobed and dentate. The leaf-cells average 25 μ in diameter. The specimens collected on the Albatross expedition and referred by the writer to *L. obvolutaeformis** agree closely with this type. In Dr. Hatcher's specimens the postical lobe is more coarsely and irregularly dentate than in the type and the leaf-cells are a little smaller, averaging 21 μ in diameter, but the plants are otherwise so similar that they can hardly be separated. It it probable that *Lophocolea obvolutaeformis* (De Not.) Massal. also belongs here, although the published descriptions† of this species differ from Taylor's specimen in a few minor details. The figure of *L. obvoluta* in the Flora Antarctica does not well represent the species.

33. LOPHOCOLEA PALLIDE-VIRENS (Hook f. & Tayl.) Mitt. Jour. Linn. Soc. **15**: 72. 1877.

Jungermannia pallide-virens Hook f. & Tayl. Lond. Jour. Bot. **3**: 473. 1844.

Chiloscyphus pallide-virens Tayl. in G. L. & N. Syn. Hep. 179. 1845.

Villarina Bay.

34. LOPHOCOLEA PUCCIOANA (De Not.) Massal. var. SUSPECTA Massal. Nuovo Gior. Bot. Ital. **17**: 228. *pl. 17. f. 1–9.* 1885.

Villarina Bay.

Prof. Massalongo has kindly confirmed my determination of these specimens. In the Sullivant collection there is a drawing labeled "*Jungermannia humilis*" which was made from specimens collected

* Contr. U. S. Nat. Herb. **1**: 140. 1892.

†Mem. Acc. Tor. II. **16**: 220. *f. 8*, 1855. Nuovo Gior. Bot. Ital. **17**: 223. 1885.

by the Wilkes Expedition. The drawing represents a plant which is identical with Dr. Hatcher's specimens. As, however, *Jungermannia humilis* Hook. f. & Tayl.* seems to have been a composite species and as Mitten† has applied the name to a plant without underleaves, it seems wisest not to change the name of De Notaris' plant. *Jungermannia humilis* is apparently not represented in the Taylor herbarium.

35. LOPHOCOLEA RIGENS (Hook. f. & Tayl.).

Jungermannia rigens Hook. f. & Tayl. Lond. Jour. Bot. **3**: 461. 1844.

Dioicous: densely caespitose, yellowish-green; stems ascending and giving off numerous simple or subdivided, ascending or erect, lateral branches, sparingly radiculose, the radicles in clusters at the bases of the underleaves: leaves imbricated, obliquely inserted, erect-spreading, strongly concave or convolute (especially on the branches), broadly ovate or orbicular, bifid about one-fourth with acute, obtuse or lunulate sinus and acute teeth, otherwise entire, more or less decurrent at antical base: underleaves ovate, bifid one-third or more with narrow sharp lobes, usually bearing on each side a small tooth at about the middle, otherwise entire: leaf-cells polygonal, thin-walled, slightly or not at all thickened at the angles: ♀ inflorescence terminal, sometimes innovating, bracts in 2 or 3 pairs, less obliquely inserted and slightly larger than the leaves but scarcely different from them in shape; bracteole ovate, bifid about one-third and bearing a small tooth on each side above the middle; perianth (young) campanulate, 3-keeled but without wings, 3-lobed at the wide, open mouth and coarsely and irregularly toothed: ♂ inflorescence borne in the course of a branch, bracts in several (about 5) pairs, imbricated and convolute, similar in shape to the stem-leaves when spread out but expanding at the antical base into an inflated pouch usually tipped with a tooth; underleaves not modified.

Stems .5–1 cm. long, 0.2 mm. in diameter; leaves (large) 0.75 mm. long and wide; underleaves (large) 0.35 mm. long, 0.3 mm. wide; leaf-cells at edge of leaf 16 μ, in middle 21 μ and at base 25 μ in diameter; perichaetial bracts 1 mm. long, 0.85 mm. wide, bracteole 0.95 mm. long, 0.7 mm. wide; perigonial bracts 0.7 mm. long, 0.5 mm. wide.

Lapotaia.

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* Lond. Jour. Bot. 3: 468. 1844.

† Botany of Kerguelen Island: Transit of Venus Expedition, 34. 1874.

This distinct little *Lophocolea* does not seem to have been recorded since its original discovery in the Falkland Islands. Dr. Hatcher's specimens agree very closely with the sterile type material in the Taylor herbarium, and I have given a full account of the species because the original description is far from complete and the figure given in the Flora Antarctica does not adequately represent the plant. Fruiting stems seem to be very rare, the plant apparently spreading by means of small branches, which, when dry, easily become detached.

The authors of *Jungermannia rigens* compared it with the European *J. Francisci* Hook. and, in the Synopsis, it is placed close to that species; the position of the branches, however, which are produced near the postical basal angle of the subtending leaves would at once remove it from the genus *Cephalozia* in which *J. Francisci* is now included. *L. rigens* belongs in the puzzling group of *Lophocoleae* with bifid leaves. Its small size and yellowish-green color, the curious rolling up of its leaves, which often gives the branches a worm-like appearance and the slight modifications which its bracts undergo will serve to distinguish it.

36. LOPHOCOLEA VASCULOSA (Hook. f. & Tayl.) Nees in G. L. & N. Syn. Hep. 702. 1847.

Jungermannia vasculosa Hook. f. & Tayl. Lond. Jour. Bot. **3**: 461. 1844.

Jungermannia elata Gottsche, Die Lebermoose Süd-Georgiens, 450. *pl. 7. f. 3–6.* 1890.

On trees, Cordilleras of Patagonia.

The figures of this species in the Flora Antarctica give a false idea of the underleaves, which are much narrower than is represented. The quoted illustration of *Jungermannia elata*, however, is more accurate in this respect. The Patagonian plants agree closely with the types of *J. vasculosa* in the Taylor Herbarium.

37. MARCHANTIA POLYMORPHA L. Sp. Pl. 1137. 1753.

Cordilleras of Patagonia: Fuegia.

Although the species of *Marchantia* which were collected during the Antarctic voyage were identified by Hooker and Taylor as *M. polymorpha*, they were afterwards referred by Mitten to *M.*

tabularis Nees.* I had hoped to find the latter species in the present collection, but a study of numerous specimens and a comparison with an authentic African plant of *M. tabularis*,† kindly sent me by Herr Stephani, have shown conclusively that Dr. Hatcher's material of this genus is all referable to *M. polymorpha*.

38. MARSUPIDIUM CRYSTALLINUM (Massal.) Besch. & Massal. Compt. rend. de la Miss. Sc. du Cap Horn, **5**: 229. 1889.

Gymnanthe crystallina Massal. Nuovo Gior. Bot. Ital. **17** 239. *pl. 22. f. 24.* 1885.

Acrobolbus excisus Schiffn. in Engler & Prantl, Nat. Pfl. Fam. **I**^{3}: 86. 1893.

Fuegia.

The material of this species is all sterile, and is present in small amount. My determination has been kindly verified by Prof. Massalongo. It is doubtful if the plant can be retained in *Marsupidium*, as we now understand that genus.

39. MARSUPIDIUM URVILLEANUM (Mont.) Mitt. in Hook. f. Handb. N. Zeal. Fl. 754. 1867.

Plagiochila Urvilleana Mont. Ann. des Sc. Nat. II. **19**: 247. 1843.

Scapania Urvilleana Mont. in G. L. & N. Syn. Hep. 63. 1844.

Jungermannia Urvilleana Hook. f. & Tayl. Lond. Jour. Bot. **3**: 468. 1844.

Gymnanthe Urvilleana Tayl. in G. L. & N. Syn. Hep. 193. 1845.

Acrobolbus Urvilleanus Trevis. Mem. reale Ist. Lomb. di Sci. e Lett. III. **4**: 423. 1877.

Jungermannia abbreviata Hook. f. & Tayl. Lond. Jour. Bot. **3**: 374. 1844.

Plagiochila abbreviata Tayl. in G. L. & N. Syn. Hep. 646. 1847.

Fuegia.

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* Hook. f. Handb. N. Zeal. Fl. 545. 1867.

† According to Schiffner (Oesterr. botan. Zeitschrift. 1896), *Marchantia tabularis* Nees is a synonym of the older *M. Berteroana* Lehm. & Lindenb.

40. METZGERIA FRONTIPILIS Lindb. Acta Soc. pro Faun. et Flor. Fenn. **1**: 14. *f. 2.* 1877.

Fuegia.

41. MYLIA ABDITA (Sulliv.).

Plagiochila abdita Sulliv. in Hook. Jour. Bot. and Kew Gard. Misc. **2**: 317. 1850.

Leioscyphus pallens Mitt. Jour. Linn. Soc. **15**: 68. 1877.

Lapotaia.

The type of *Plagiochila abdita* is not to be found at present in the Sullivant Herbarium, but there is a drawing of the species there, which agrees very closely with the Lapotaia specimens and also with the published descriptions and figures* of *Leioscyphus pallens.* The two genera, *Mylia* and *Leioscyphus* (or *Leptoscyphus*), are both given places by Schiffner† in his recent treatment of the genera of Hepaticae. He recognizes, however, that they are very close to each other and points out only two, purely vegetative, characters to distinguish them: in *Mylia* the leaves are said to be *alternate* and the underleaves *undivided;* whereas in *Leioscyphus*, the leaves are said to be *opposite* and the underleaves *bifid.* The first distinction, however, does not hold, as there are acknowledged species of *Leioscyphus* (*e. g., L. chiloscyphoideus*) with alternate leaves; and the second distinction seems hardly sufficient to separate the genera.

42. MYLIA CHILOSCYPHOIDEA (Lindenb.).

Plagiochila chiloscyphoidea Lindenb. in Lehmann, Pugillus, **8**: 4. 1844.

Leioscyphus chiloscyphoideus Mitt. Fl. Tasmaniae, **2**: 225. 1860.

Feugia.

43. PIGAFETTOA CRENULATA Massal. Nuovo Gior. Bot. Ital. **17**: 237. *pl. 21. f. 23.* 1885.

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* Mitten, Botany of Kerguelen Island: Transit of Venus Expedition, *pl. 3. f. 6.* 1874. Schiffner and Gottsche, Lebermoose der Forschungsreise S. M. S. "Gazelle," *pl. 3. f. 4, 5.* 1890.

† Engler & Prantl, Nat. Pfl. Fam. 1^3: 89, 90. 1893.

44. PLAGIOCHILA ANSATA Hook. f. & Tayl. in G. L.& N. Syn. Hep. 649. 1847. [Plate 347.]

Jungermannia ansata Hook. f. & Tayl. Lond. Jour. Bot. **3**: 457. 1844.

Plagiochila circinalis var. Besch. & Massal. Bull. Soc. Linn. de Paris, 627. 1886.

Dioicous: plants growing in loose tufts, blackish-brown varying to pale brown or yellowish-green: stems simple or sparingly branched, sometimes innovating from below the perianth, slightly or not at all radiculose: leaves distant or subimbricated, erect-spreading or erect and appressed to the stem, orbicular-obovate, rounded at the broad apex, cuneate at the base, margin entire or repand, the antical decurrent, the postical rounded near the base and less decurrent: underleaves wanting: leaf-cells polygonal (mostly 6-sided), becoming elongated toward base, trigones very conspicuous, separated by narrow thin-walled regions or pits: ♀ inflorescence terminal, the bracts in 2 or 3 pairs, passing by gradual transitions into the stem-leaves, the margins coarsely and irregularly dentate with 1–5 sharp teeth or blunt projections, innermost bracts narrower than the others, ovate or obovate in shape; perianth long-exserted, flattened, exalate, clavate, very gradually narrowed toward the base and truncate at the apex, mouth bilabiate, ciliate-dentate, perianth 2 cells thick except close to the base where it is 3 cells and near the mouth where it is only one cell.

Stem 5 cm. or more long, 0.25 mm. in diameter; leaves 1.5 mm. long, 1.4 mm. wide; leaf-cells on edge of leaf 25 μ, in the middle 29 μ and at the base 53 μ × 29 μ; bracts of innermost row 1.5 mm. × 0.95 mm. and 1.7 mm. × 1.35 mm., perianth 4 mm. long, 1.2 mm. wide.

Villarina Bay.

Plagiochila ansata is a species of wide distribution in southern regions, having been reported also from the Falkland Islands and from New Zealand. The type specimens from the first of these localities agree closely with the Fuegian plants; but, as the published descriptions and figures of the species are somewhat inadequate, it has seemed advisable to describe and figure it anew. The description given above is drawn from robust stems, particularly those bearing perianths; sterile stems and the branches and innovations of fertile plants are sometimes much more slender and bear scattered and smaller leaves. Even in the most slender forms, however, the characteristic leaf-cells with their well-developed

trigones are retained. Judging from the description, the specimens doubtfully referred by Bescherelle and Massalongo to *Plagiochila circinalis* belong here. Herr Stephani has kindly sent me a specimen of the last-named species from Australia ; and, although it is certainly a near ally of *P. ansata*, it differs from it in the following points : the plants are more robust, the leaves are densely imbricated and their antical margins spread out from the stem and are strongly revolute throughout nearly their whole length, the leaf-cells are scarcely, if at all, elongated at the base, their trigones are even more conspicuous, they are oval or circular in outline and are very frequently confluent.

45. PLAGIOCHILA BISPINOSA Lindenb. Ann. Sci. Nat. IV. **8** : 326. *pl. 11. f. 7–13.* 1858.

Villarina Bay.

46. PLAGIOCHILA DURICAULIS Hook. f. & Tayl. in G. L. & N. Syn. Hep. 641. 1847.

Jungermannia duricaulis Hook. f. & Tayl. Lond. Jour. Bot. **3** : 458. 1844.

Fuegia.

47. PORELLA FOETENS (De Not.) Trevis. Mem. reale Ist. Lomb. di Sci. e Lett. III. **4** : 407. 1877.

Madotheca foetens De Not. Mem. Acc. Tor. II. **16** : 231. *f. 17.* 1855.

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48. RADULA FLAVIFOLIA Tayl. in G. L. & N. Syn. Hep. 259. 1845.

Jungermannia flavifolia Hook. f. & Tayl. Lond. Jour. Bot. **3** : 476. 1844.

Fuegia.

49. SCHISTOCHILA GAYANA (Gottsche) var. MASSALONGOANA (Schiffn. & Gottsche).

Gottschea Gayana var. Massal. Nuovo Gior. Bot. Ital. **17** : 205. *pl. 12. f. 2.* 1885.

Gottschea Gayana var. *Massalongoana* Schiffn. & Gottsche, Lebermoose der Forschungsreise S. M. S. "Gazelle," 2. 1890.
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50. SCHISTOCHILA LAMELLATA (Hook.) Dum. Recueil d'obs. sur les Jung. 15. 1835.

Jungermannia lamellata Hook. Musc. Exot. *pl. 49.* 1818.
Gottschea lamellata Nees in G. L. & N. Syn. Hep. 20. 1844.
Villarina Bay.

51. SCHISTOCHILA LAMINIGERA (Hook. f. & Tayl.) Evans, Contr. U. S. Nat. Herb. **1**: 141. 1892.

Jungermannia laminigera Hook. f. & Tayl. Lond. Journ. Bot. **3**: 456. 1844.
Gottschea laminigera Tayl. in G. L. & N. Syn. Hep. 623. 1846.
Fuegia.

52. TRICHOCOLEA TOMENTOSA (Swartz) Gottsche in G. & R. Hep. Eur. Exs. no. 272.

Jungermannia tomentosa Swartz, Prod. Fl. Ind. occ. 145. 1788.
Jungermannia tomentella var. *tomentosa* Lindenb. Hep. Eur. 19. 1829.
Trichocolea tomentella var. *tomentosa* G. L. & N. Syn. Hep. 237. 1844.
Leiomitra tomentosa Lindb. Acta Soc. Sci. Fenn. **10**: 515. 1875.
Basichiton tomentosum Trevis. Mem. reale Ist. Lomb. di Sci. e Lett. III. **4**: 394. 1877.
Fuegia.

53. TYLIMANTHUS ANDERSSONII (Ångstr.). [Plate 348.]

Jungermannia tenella Ångstr. Öfversigt af Kongl. Vetensk. Akad. Förhand. **29**, Häft 4: 11. 1872. (Not Hook f. & Tayl.).
Gymnanthe Anderssonii Ångstr. l. c. **33**, Häft **4**: 50. 1876.

Dioicous: growing in loose tufts or mixed with other hepaticae, pale or whitish-green: plants consisting of a prostrate caudex giving rise to ascending or erect stems: caudex radiculose, usually bearing scattered rudimentary leaves: stems without rhizoids or

with a few scattered ones close to the caudex, simple or sparingly branched, sometimes giving off radiculose stolons from the lower part; stem-leaves distant and rudimentary below, more or less imbricated and larger above, obliquely inserted, somewhat concave, obovate-orbicular from a narrowed base, antical margin decurrent, straight or slightly curved, entire, postical margin reaching nearly to middle of stem, slightly or not at all decurrent, entire, sinuate, or with a few scattered teeth, apex broad and variable, sometimes distinctly emarginate-bilobed, with acute, obtuse or rounded lobes, sometimes truncate, entire or sparingly and irregularly dentate with blunt teeth; underleaves wanting; leaf-cells thin-walled with small but distinct trigones, somewhat elongated toward base, cuticle smooth: ♀ inflorescence terminal on short ascending stems or elongated branches; bracts crowded, similar to the leaves, but even more irregular in shape, sometimes unequally 2-lobed, the innermost narrower and more delicate than the others and sometimes more conspicuously toothed, sac tapering to a blunt point, radiculose: ♂ inflorescence borne in the course of ascending stems, bracts in about five pairs, imbricated, strongly saccate below, but with spreading apices above, broadly orbicular when explanate, truncate or emarginate-bifid, the postical lobe being the larger.

Stems 1.5–3 cm. long, 0.35 mm. in diameter; leaves 1.7 mm. long, 1.85 mm. broad; leaf-cells at base 58 μ long, 29 μ broad, in other parts of the leaf 29 μ in diameter; outer perichaetial bracts 1.9 mm. long and broad, sac 2.7 mm. long, 1 mm. in diameter; perigonial bracts 1 mm. long, 1.45 mm. wide. The foregoing measurements may be considered representative of this very variable species.

Lapotaia.

In its pale color and in the shape and areolation of its leaves, the present plant strongly resembles *Marsupidium Urvilleanum*, which is a more robust species with its leaves more strongly dentate and inflexed on their antical margins. As far as can be judged from descriptions, the two species differ from each other in the position of the ♀ inflorescence and pendant sac, necessitating their separation into distinct genera. In *Marsupidium Urvilleanum*, this sac is described by Mitten* as "attached to the lower part of the stem by its side;" in the closely related (if not identical) *M. Brecknockiense* (Massal.) Besch. and Massal., its author† says: "perichaetia ad ramorum basim et in ramulo brevissimo sublaterali

* Handb. N. Zeal. Fl. 754. 1867.

† Nuovo Gior. Bot. Ital. 17: 214. 1885.

radicante posita"; in the species described above, on the contrary, the sac is clearly terminal on ascending stems or elongated branches, showing that the plant is a *Tylimanthus*. The sac moreover has the same structure as that ascribed to this genus—its wall is closely adherent to the calyptra and it bears a cluster of unfertilized archegonia at its mouth. At my request Professor Nathorst has kindly sent me some of the original specimens of *Gymnanthe Anderssonii* as determined by Ångström. So far as can be decided from sterile plants, these belong to the same species as Dr. Hatcher's specimens, although in some of them the leaves are a little more toothed.

YALE UNIVERSITY.

Explanation of Plates.

PLATE 345. *Blepharostoma pilosum* Evans. 1. Plants, natural size. 2. Part of stem, antical view (×32). 3. Leaf (×32). 4. Leaf subtending branch (×32). 5. Underleaf (×32). 6. Cells from middle of leaf (×290). *Blepharostoma quadripartitum* (Hook.) Trevis. 7. Leaf (×32). 8. Perichaetial bract (×32).

PLATE 346. *Jungermannia Hatcheri* Evans. 1. Plant, natural size. 2. Part of gemmiparous stem, antical view (×16). 3, 4. Leaves (×16). 5, 6. Underleaves (×28). 7. Cells from middle of leaf (×255). *Jungermannia propagulifera* Gottsche. 8. Plants, natural size. 9. Part of stem with ♂ and ♀ inflorescence, antical view (×16). 10. Part of stem with perianth, antical view (×16). 11. Leaf (×16). 12. Cells from middle of leaf (×255). 13, 14. Innermost perichaetial bracts, 13 with connate bracteole (×16). 15. Bract of next outer row (×16). 16, 17. Perigonal bracts (×16); 13–17 from one inflorescence. 18. Innermost perichaetial bracts with connate bracteole between them, from another inflorescence (×16).

PLATE 347. *Plagiochila ansata* Hook. f. & Tayl. 1. Plants, natural size. 2. Part of stem with perianth, lateral view (×15). 3. Part of sterile stem, lateral view (×15). 4. Cells from middle of leaf (×290). 5, 6, 7. Bracts, in regular order from perianth (×15). 8. Transverse section of perianth (×18). 9. Teeth from mouth of perianth (×290).

PLATE 348. *Tylimanthus Anderssonii* (Ångstr.) Evans. 1. Plants, natural size. 2. Sterile stem, postical view (×12). 3. Female stem with two young sacs (×12). 4. Female stem with mature sac (×12). 5. Male stem, antical view (×12). 6. Cells from middle of leaf (×220). 7, 8, 9. Perichaetial bracts (×12). 10. Perigonial bract (×14).

A Revision of the Genera Chloris and Eustachys in North America.

BY GEORGE V. NASH.

Most recent authors have united these two genera, and, while they do bear certain resemblances, we have come to the conclusion, after a careful examination of all the material at our disposal, that they are much better treated as genera than as two sections of one genus. The resemblances are those which are, in great part, common to all the genera of the tribe *Chlorideae*, that is, they both have one-sided spikes with the spikelets sessile and alternately arranged in two rows. These are their most marked resemblances, and, as intimated above, are not peculiar to either genus. The compressed culms and sheaths are common to both, but much more manifest in *Eustachys*. The details of the spikelet, however, present differences which seem to justify their separation. The general make-up of the spikelet is essentially the same as it is in all the related genera, but in the forms of some of its parts peculiarities appear which can be relied upon for generic distinction. It is true that in a few rare instances in *Chloris* the awn of the third scale is very short, but in the great majority of the species the awn is distinctly manifest, and in a large number of them it is very long. In *Eustachys*, on the contrary, the awn of the third scale is hardly manifest, and usually less than 1 mm. long, often but a mere point, and frequently entirely wanting. The few short-awned forms of *Chloris* can be at once distinguished from *Eustachys* by the second empty scale, which in this latter genus is broad and of approximately the same width from the base to the apex which is at least truncate, and usually 2-toothed or 2-lobed and distinctly awned. In *Chloris* both the empty scales are lanceolate or narrowly ovate, hence with the sides converging at the acute or acuminate apex, and in a few species the midnerve is continued as a short point. In all the material examined this distinctive character of the second scale is constant, and this, in the case of *Eustachys*, in conjunction with the more flattened culms and sheaths and the strongly equitant character of the latter at the base of the culms, together with the absence of the awn in the third scale, or, when present, its

extreme shortness, appear to us to warrant the maintenance of *Eustachys* as distinct from *Chloris*. In general appearance the two groups are readily distinguishable, thus adding confirmatory evidence to the technical characters above alluded to.

In North America, the distribution of the two genera is markedly different. *Chloris*, with the exception of one species, *C. barbata*, does not occur native east of the Mississippi River. This one exception is in southern peninsular Florida and is a West Indian plant which is also found in South America. *Eustachys*, on the other hand, with one exception, *E. petraea*, is not indigenous west of the Mississippi, but is mainly confined to the southeastern United States. *E. petraea* extends as far west as Texas, and much beyond the limits of North America. *Chloris* appears to be abundant in the southwestern United States and Mexico, and probably southward into South America, while *Eustachys*, as stated above, is mainly confined, in the United States, to the southeastern portion, and is particularly partial to Florida, all four species being found in that State, two of them not known outside its borders, and one species, *E. Floridana*, extending just beyond the line into Georgia. The fourth species, *E. petraea*, as stated, has a wider range, extending from Florida along the Gulf Coast to Texas, and thence through Central America to South America; also in the West Indies and the Bahamas.

Descriptions follow of the two genera with the species under them and their distribution, so far as known, at the present time. In order that the knowledge of this distribution may be extended and better defined, additional herbarium material would be highly prized, and the hope is expressed that those having such material to spare will send it to the author, who will gladly determine it.

The material, upon which the results obtained in this paper are based, is contained in the herbaria of the New York Botanical Garden, Columbia University, and the Division of Agrostology, at Washington, D. C., and also in the author's own private collection. The material from the herbarium of the Division of Agrostology. kindly loaned for examination by Prof. Scribner, has been of especial value and has greatly aided us in this revision, as it is particularly rich in forms from Texas and the adjacent country, in which region the genus *Chloris* is largely represented.

CHLORIS Sw. Prod. 25. 1788.

Tufted annual or perennial sometimes glaucous grasses with round or more or less compressed smooth and glabrous culms and sheaths, flat or folded obtuse or acute leaves, and terminal inflorescence composed of erect or spreading 1-sided spikes arranged usually in a terminal whorl, or sometimes with the addition of a whorl or two, or of several scattered spikes, very rarely single. Spikelets alternately arranged in 2 rows on one side of a triangular rachis and more or less divergent from it. Scales 4–9, the awns hispidulous; outer 2 scales empty, membranous, keeled, 1-nerved, the nerve hispidulous, the first scale acute, shorter than the second which is acute or acuminate and sometimes awn-pointed; third scale firmer, chartaceous, keeled, 3-nerved, the nerves usually more or less pilose, or rarely the midnerve glabrous or hispidulous only, awned, the awn usually manifest, sometimes very long, the scale enclosing a perfect flower and a 2-nerved palet as long as the scale or a little shorter, the nerves ciliolate; fourth scale of various and characteristic shapes, similar in texture to the third, awned, from acute to truncate at the summit which is usually inrolled, 3–7-nerved, generally empty, rarely enclosing a shorter palet and flower; the remaining scales successively smaller and empty. Stamens 3. Styles distinct; stigmas plumose. Grain free, linear to elliptic, nearly round or 3-sided.

A genus of about 40 species, widely distributed in all warm or tropical regions, excepting those of Europe. Some of the species are cultivated for ornament, but none appear to be of economic value or importance.

In general appearance the species bear much resemblance to each other, but the technical characters separating them, while confined to small organs and requiring careful dissection, are wonderfully constant. In several closely related species the fourth scale has been found to be of great importance. Its shape and particularly the formation of the apex have proved of especial value. The venation of this scale has also furnished characters for separating species of close affinities. While usually 3-nerved, it is sometimes 5- or 7-nerved above the middle by the branching of the lateral nerves at that place, the branches being sometimes faint but readily discernible on close inspection.

The genus has two fairly marked groups, one with the base of the slender racemes naked or furnished with but few scattered

spikelets, the other with the spikelets crowded to the very base of the stouter and usually shorter racemes. The essential and diagnostic details of the two groups will be found in the following key:

Key to the Species.

Spikes slender, usually naked at the base or with a few scattered spikelets.
- Mid-nerve of the third scale not pilose, but hispidulous above the middle. 1. *C. Nealleyi.*
- Nerves of the third scale all pilose.
  - Apex of the elliptic fourth scale acute. 2. *C. tenuispica.*
  - Apex of the obovate-cuneate fourth scale obliquely truncate. 3. *C. verticillata.*

Spikes stout, spikelet-bearing to the base.
- Hairs on the nerves of the third scale short, .5 mm. or less long, not manifest and not extending beyond the apex of the scale.
  - Fourth scale obovate-cuneate, 3-nerved, .6 mm. wide, the apex unequally rounded. 4. *C. brevispica.*
  - Fourth scale obcuneate or triangular, 5-nerved, 1 mm. or a little more broad. 5. *C. latisquamea.*
  - Fourth scale broadly triangular, 7-nerved, wider than long. 6. *C. cucullata.*
- Hairs on the lateral nerves of the third scale long, 1 mm. or more in length, manifest and decidedly extending beyond the apex of the scale.
  - Hairs on the lateral nerves of the third scale about equal in length.
    - Hairs exceeding the apex of the scale, about 1 mm. long; fourth scale 1 mm. wide; upper surface of the leaves glabrous. 7. *C. Texana.*
    - Hairs much exceeding the apex of the scale, 2–3 mm. long; fourth scale .5 mm. wide; upper surface of the leaves near the base usually long-hairy. 8. *C. barbata.*
  - Hairs on the lateral nerves of the third scale unequal in length, those at the summit much longer.
    - Scales 4, rarely 5; third scale one third as broad as long, the terminal hairs on the lateral nerves 2.5–3 mm. long. 9. *C. elegans.*
    - Scales 7–9, the upper ones much reduced; third scale one sixth as broad as long, the terminal hairs on the lateral nerves about 1 mm. long. 10. *C. Prieuri.*

1. CHLORIS NEALLEYI nom. nov.

Chloris Texensis Nash, Bull. Torr. Bot. Club, **23**: 151. 1896. Not *C. ciliata* var. *Texana* Vasey. 1890.

Culms 3–6 dm. tall, compressed, tufted, simple, or branched at the base, erect; nodes 2: culm leaves about 2; sheaths usually longer than the internodes, smooth, compressed, keeled; ligule a scarious ciliolate ring about .5 mm. broad; blades 2.5–15 cm. long, 3–5 mm. wide, smooth beneath, rough above and on the margins: inflorescence exserted; spikes 5–8, 10–18 cm. long,

pilose at the base which is naked or with a few scattered spikelets : spikelets, exclusive of the awns, about 4 mm. long : scales 4 ; outer empty scales often purplish, acuminate, the first scale three fourths as long as the second which is about 3.5 mm. long ; third scale, exclusive of the awn, 4 mm. long, in side view equilateral and .8 mm. wide, acute, the internerves rough, especially above the middle, the callus pilose, the lateral nerves pilose above the middle, the hairs increasing in length toward the apex, the midnerve hispidulous above the middle, the awn inserted just below the apex, 6–9 mm. long, the palet as long as the scale ; fourth scale 2–2.5 mm. long, in side view elliptic and about .5 mm. wide, the apex acute, the lateral nerves glabrous, the midnerve hispidulous above the middle, the awn inserted just below the apex, 4–5 mm. long.

Texas. Collected by both G. C. Nealley and F. W. Thurow, and apparently only by them. The larger third and fourth scales, together with the glabrous midnerve of the former and the different shape of the latter, readily separate this from *C. verticillata* Nutt. The collection by Mr. Nealley is taken as the type.

2. CHLORIS TENUISPICA sp. nov.

Culms 2–4 dm. tall, erect, tufted, compressed, simple or somewhat branched at the base, the innovations about one half as long as the culms ; nodes 3 or 4 : culm leaves 3 or 4 ; sheaths overlapping, compressed, keeled ; ligule a scarious ciliolate ring about 1 mm. wide ; blades 4–15 cm. long, 2–3 mm. wide, linear, abruptly acute, smooth beneath and often with a few scattered hairs arising from papillae, rough above and on the margins : inflorescence with the axis 2 cm. or less long, angled, the angles hispidulous ; spikes 10–12, 6–10 cm. long, finally widely spreading, in about two whorls, very slender, pilose at the base, which is naked or with a few scattered spikelets : spikelets, exclusive of the awns, about 3 mm. long ; scales usually 4, sometimes 5, the outer empty ones narrow, acuminate, awn-pointed, the first scale about three fourths as long as the second, which is 3–3.5 mm. long ; third scale with the callus pilose, about 3 mm. long, in side view elliptic, equilateral and .7 mm. wide, the lateral nerves pilose their entire length, the midnerve to the base of the awn, which is inserted just below the acute apex and is 4–6 mm. long, the palet slightly shorter than the scale ; fourth scale sparingly pilose on the midnerve only, occasionally enclosing a perfect flower (and in this case the scale a little larger than usual), similar to the third, though smaller, usually empty, somewhat inequilateral in side view, the margins

more curved than the midnerve, which is almost straight, the lateral nerves but little more curved than the midnerve, 1.75–2 mm. long, in side view about .5 mm. wide, acute at the apex, the awn inserted just below the apex, 2.5–4 mm. long; fifth scale, when present, less than 1 mm. long with an awn shorter than itself.

Texas. Resembles in general appearance and in its outer empty scales *C. verticillata*, but its narrower leaves, very slender spikes, and the acutish and not truncate fourth scale readily distinguish it. The fourth scale occasionally bearing a flower and maturing seed is a character not noted in any other species. It is at once known from *C. Nealleyi* by the smaller third scale with its pilose midnerve.

The type material was collected by Mr. G. C. Nealley in 1889. It was also secured by him the following year. Mr. S. B. Buckley collected it in 1883, and Mr. J. G. Smith secured it at Alice, on June 7, 1897, no. 4.

3. CHLORIS VERTICILLATA Nutt. Trans. Am. Phil. Soc. II. **5**: 150. 1833–37.

Culms 2–5 dm. tall, compressed, at first erect, at length decumbent at the base and rooting at the lower nodes, simple or somewhat branched; nodes of the erect part of the culm 1–4: leaves 1–several; sheaths compressed, keeled, overlapping, a few long hairs on each side at the apex, the uppermost one much elongated; ligule a scarious ciliolate ring about .5 mm. wide; blades 1.5–18 cm., usually less than 8 cm., long, 2–4 dm. broad, smooth beneath, rough above and on the margins, linear, obtuse: inflorescence at length exserted, the axis .5–5 cm., usually 2–3 cm., long, angled, the angles hispidulous; spikes 8–21, commonly exceeding 12, 5–15 cm. long, generally more than 10 cm., pilose at the base which is usually naked or with a few scattered spikelets, at length widely spreading, arranged in 1–4 whorls, or the upper ones scattered or approximate, the rachis hispidulous on the back: spikelets, exclusive of the awns, about 3 mm. long: scales 4, with rarely the minute rudiment of a fifth scale; outer empty scales acuminate, awn-pointed, the first scale from two thirds to three fourths as long as the second which is about 3 mm. long; third scale pilose on the callus, 2.5–2.75 mm. long, in side view nearly equilateral and .8 mm. wide, the lateral nerves pilose their entire length with short hairs, the midnerve as far as the awn, which is inserted just below the apex and is 5–8 mm. long, the palet as long as the scale; fourth scale 1.5–2 mm. long, in side view obovate-

cuneate and about .75 mm. wide, inequilateral, the midnerve straight, the lateral nerves much curved, the apex obliquely truncate with the marginal corner rounded, thus making the extranerval portion crescent-shaped, the awn inserted at or just below the apex, 4–5 mm. long.

Sandy soil, Arkansas to Kansas, south to Texas. In the herbarium of Columbia University is preserved a specimen of Nuttall's collection in Arkansas.

The following are to be referred here:

Kansas: Ulysses, C. H. Thompson, June 27, 1893, no. 55.

Indian Territory: Between Fort Cobb and Fort Arbuckle, Palmer, 1868, no. 396. Sapulpa, B. F. Bush, June 19, 1894, no. 779; Redfork, June 21, no. 780; Claremore, Sept. 18, no. 783.

Oklahoma: M. A. Carlton, June, 1891, no. 210. Stillwater, J. Hayes Bone, 1896, no. 30.

Texas: Dallas, J. Reverchon, June, no. 3440**.

4. CHLORIS BREVISPICA sp. nov.

Chloris verticillata var. *intermedia* Vasey; L. H. Dewey, Contr. U. S. Nat. Herb. **2**: 528. In part. 1894. Not *C. intermedia* A. Rich. 1851.

Culms 1–2 dm. tall, compressed, decumbent at the base, at length somewhat branching; nodes 2 or 3: culm leaves 2 or 3; sheaths compressed, shorter than the internodes, keeled; ligule a scarious ciliolate ring less than 1 mm. long; blades 1–6 cm. long, 1–3 mm. wide, erect or ascending, smooth beneath, rough above and on the margins: inflorescence consisting of 6–10 finally spreading spikes, spikelet-bearing to the base, 2.5–4.5 cm. long: spikelets, exclusive of the awns, about 2.8 mm. long; scales 4; outer empty ones lanceolate, acute, usually tinged with purple, the first scale a little more than one half as long as the second which is about 2 mm. long; third scale 2.5 mm. long, in side view about equilateral, elliptic and about .75 mm. wide, the callus pilose, the midnerve sparingly pilose with short hairs to the awn, the lateral nerves more copiously nearly to the apex, the hairs about .5 mm. long, the awn inserted a little below the apex, about 2 mm. long, the palet equaling the scale; fourth scale obovate-cuneate, about 1.5 mm. long, in side view about .6 mm. wide, the midnerve almost straight, the lateral nerves considerably curved, the apex unequally rounded, the extranerval portion crescent-shaped, the awn inserted below the apex, 1.4–1.8 mm. long.

Sandy soil, Texas. Readily distinguished from *C. verticillata* by its shorter and less numerous spikes, broader empty scales, shorter awns, and smaller and differently shaped fourth scale.

The following specimens belong here:

G. C. Nealley, 1885; Hockley, F. W. Thurow, 1891; Nueces Co., A. A. Heller, 1894, Mar. 21, no. 1471 (the type), and Gregory, April 14, no. 1579.

5. CHLORIS LATISQUAMEA nom. nov.

Chloris verticillata var. *intermedia* Vasey; L. H. Dewey, Contr. U. S. Nat. Herb. **2**: 528. In part. 1894. Not *C. intermedia* A. Rich. 1851.

Culms 2–6 dm. tall, compressed, simple at first, finally branched at the decumbent base and rooting at the lower nodes; nodes 2 or 3: culm leaves 2 or 3; sheaths usually much shorter than the internodes, compressed, keeled; ligule a scarious ciliolate ring less than 1 mm. wide; blades 1–10 cm. long, 2–4 mm. wide, linear, obtuse, rough on both surfaces and on the margins: inflorescence exserted, the axis 1.5 cm. or less long, angled, the angles hispidulous; spikes 10–16, 3–7 cm. long, finally widely spreading and often more or less flexuous, spikelet-bearing to the base: spikelets, exclusive of the awns, 2.3–2.8 mm. long; scales 4; outer empty ones acute, the first scale about one half as long as the second, which is about 2 mm. long; third scale 2.2–2.7 mm. long, in side view elliptic and .8–.9 mm. broad, about equilateral, the callus pilose, the lateral nerves strongly pilose their entire length with short hairs, the midnerve less so to the base of the awn, which is inserted just below the apex and is 1.5–3 mm. long, the palet about as long as the scale; fourth scale 1.5–1.7 mm. long, in side view obcuneate or rarely triangular and 1–1.2 mm. broad, 3-nerved, the midnerve straight, the lateral nerves much curved, branching at the middle, thus making the scale appear 5-nerved at the truncate apex, the extranerval portion triangular, .5 mm. wide, the awn inserted just below the apex, 1.5–2 mm. long.

Dry ground and shady river banks, Texas. Distinguished from *C. verticillata* by the shorter spikes, shorter and broader outer empty scales, and the broader and more nerved fourth scale; the different shape and the much greater width of this latter organ, together with its much more spreading awn, also serving to separate it from *C. brevispica*, to which it is closely related.

The following specimens are referred here:

Houston, Elihu Hall, April 20, 1872, no. 773; San Diego, Miss Mary B. Croft, 1884, no. 60a; Del Rio, G. C. Nealley, 1892; Fort Clark, Kinney Co., Edgar A. Mearns, 1892, Dec. 3, no. 1233, and 1893, April 29, no. 1424; A. A. Heller, 1894, Gregory, San Patricio Co., April 14, no. 1580, and Kerrville, Kerr Co., May 14–21, no. 1767 (the type); Kerrville, J. G. Smith, June 21, 1897.

The *C. verticillata* var. *intermedia* of Vasey, judging from what we take to be the original material, comprises two well-marked forms. This material is in the National Herbarium and consists of three sheets on which are written, presumably in the handwriting of Dr. Vasey, these words: "Intermediate between *cucullata* and *verticillata*." No definite indication of what was considered the type occurs on any one of the sheets and in fact a varietal name is not indicated. The plants on one of the sheets above referred to were collected by F. W. Thurow, at Hockley, Texas, in 1891, and belong to the preceding species. The other two sheets, the specimens of which were collected, on one by G. C. Nealley, in Texas, and on the other by Elihu Hall, at Houston, in the same state, in 1872, no. 773, have been referred here. Dr. Vasey, so far as can be ascertained, never published such a variety himself. Mr. L. H. Dewey, however, as indicated in the synonymy above, did publish a variety *intermedia* and accredited its authorship to Vasey, but as this is invalidated by the *C. intermedia* of A. Richard, as previously shown in the synonymy, the lack of definite information as to just what is the type loses much of its importance. On account of this impossibility of identifying the type of the variety, we have thought it best, in order that authentic material of what we have above designated as *C. latisquamea* may be accessible to a large number of herbaria, to take as the type of this new species material from some large collection which is widely distributed, not only in this country, but also in Europe. Mr. A. A. Heller's no. 1767, collected at Kerrville, Kerr Co., Texas, May 14–21, 1894, seems best to serve this purpose.

6. CHLORIS CUCULLATA Bisch. Ann. Sci. Nat. III. **19**: 357. 1853.

Chloris verticillata var. *aristulata* Torr. Pac. R. R. Surv. Pope's Rep. **2**: Bot. 176. 1855.

Culms 2–7 dm. tall, compressed, erect, or later decumbent a the base and rooting at the lower nodes; nodes of the erect culm 2 or 3: culm leaves 2 or 3; sheaths compressed, keeled, loosely embracing the culm, much shorter than the internodes, usually rough on the keel; ligule a scarious ring 1 mm. or less broad; blades 2–15 cm. long, 3 mm. or less wide, erect or nearly so, flat, or folded when dry, very rough on both surfaces: inflorescence consisting of 6–15 spikes, usually 8–10, 2–4 cm. long, often flexuous, widely spreading, spikelet-bearing to the base: spikelets, exclusive of the awns, 1.7–2 mm. long, triangular, about as broad as long: scales 4; first scale acute, one half to three fifths as long as the second which is 1.5–1.75 mm. long and broader above the middle; third scale 1.7–2 mm. long, in side view elliptic and about .9 mm. wide, nearly equilateral, obtuse, the callus pilose, the lateral nerves densely pilose their entire length with short hairs about .4 mm. long, the midnerve sparingly so, the awn inserted just below the apex, .5–1 mm. long, the palet about as long as the scale; fourth scale about 1 mm. long, in side view broadly triangular and 1.3 mm. broad, the midnerve slightly curved, the lateral nerves branching twice, making the scale appear 7-nerved above, the awn inserted just below the apex .2–.3 mm. long: seed elliptic, about 1.3 mm. long, finely striate.

Sandy soil, Texas. At once distinguished from all other species by its very broad 7-nerved fourth scale.

The following specimens are referred to this species:

Lindheimer, 1847, no. 730. Austin, Elihu Hall, 1872, no. 776. Upper Brazos, J. Reverchon, Sept., 1879, no. 1148; also at Seymour, Sept., no. 3440*. San Diego, Miss Mary B. Croft, 1884, no. 60. Laredo, C. G. Pringle, July 24, 1889, no. 2405. Austin, J. E. Bodin, Sept., 1891, no. 292. Corpus Christi, Nueces Co., A. A. Heller, March 14–21, 1894, no. 1449. R. T. Hill, 1895, no. 86.

7. CHLORIS TEXANA (Vasey).

Chloris ciliata var. *Texana* Vasey, Bull. U. S. Dept. Agric. Div. Bot. **12**[1]: 30. 1890.

Culms 2.5–6 dm. tall, simple, slender, compressed; nodes about 3: culm leaves about 3; sheaths much shorter than the internodes, coarsely striate; ligule a scarious ciliolate ring about .5 mm. broad; blades 6–20 cm. long, 3–6 mm. wide, flat, ascending, rough on the margins and toward the apex on the lower surface, otherwise smooth: inflorescence finally exserted; spikes 3–6, 4–8

cm. long, erect or nearly so, spikelet-bearing to the base: spikelets, exclusive of the awns, about 2.8 mm. long: scales 6; outer empty ones very acute, pointed, the first scale about three fifths as long as the second, which is 2.5–3 mm. long; third scale, with the callus pilose, about 2.7 mm. long, in side view inequilateral and 1 mm. broad, the margin much more curved than the midnerve, the nerves pilose with hairs about 1 mm. long, which extend beyond the apex of the scale, the lateral nerves except at the base and the apex, the midnerve up to the awn, which is inserted just below the apex and is about 1.5 mm. long, the palet about as long as the scale; fourth scale about 1.7 mm. long, in side view obovate-cuneate and 1 mm. wide at the truncate and obscurely crenulate apex, 3-nerved, the midnerve almost straight, the lateral nerves much curved, the extranerval portion broadly triangular, the awn inserted just below the apex, 1–1.25 mm. long, the palet about three-fifths as long, narrow, the nerves ciliolate; fifth scale similar to the fourth, 1 mm. long, in side view .8 mm. wide; sixth scale about .5 mm. long.

Southern Texas. Apparently collected only by G. C. Nealley at Brownsville in 1889. Occurs also in the West Indies. Ricksecker's no. 42, collected at St. Croix, D. W. Indies, on Nov. 4, 1895, belongs here.

This, as indicated above, has been considered a variety of *C. ciliata* Sw., but according to our conception of that species, based upon the descriptions of its author, this must be quite different. In the original place of publication of *C. ciliata*,* Swartz does not give a very extended description, and if this were the only source from which to draw the result would be rather dubious, but in his subsequent work on the flora of the West Indies† a much longer and more definite description is given, with a reference to the first place of publication. In this latter work the sheaths are said to be villous at the throat, and the third scale with an awn twice its length and the hairs as long as the scale. In *C. Texana*, as will be noted above, the ligule is a mere ciliolate scarious ring which could hardly be called villous under any conception of that term, and the third scale has the awn much shorter than itself and the hairs longer than the scale. What the *C. ciliata* of Swartz is we do not know, no material that could be prop-

* Prod. 25. 1788.

† Fl. Ind. Occ. 1: 197. 1797.

erly referred there having come under our observation. About the name which we have adopted for this plant, *C. Texana*, there can be no doubt as the type has been seen.

8. CHLORIS BARBATA (L.).

Andropogon barbatum L. Amoen. Acad. **5**: 412. 1759. Not of Mant. 302. 1767.

Andropogon polydactylon L. Sp. Pl. 1483. 1763. [Ed. 2.]

Chloris polydactyla Sw. Prod. 26. 1788.

Culms 5–10 dm. tall, round or slightly flattened; nodes 3 or 4: culm leaves 3 or 4; sheaths striate, the lower ones overlapping, the upper shorter than the internodes; ligule a scarious ciliolate ring about 1 mm. broad; blades 6 dm. or less long, 1 cm. or less wide, attenuate into a long slender point, smooth on both surfaces, rough on the margins, usually densely pilose on the upper surface at the base, just above the ligule, with hairs 3–4 mm. long: inflorescence at length long-exserted; spikes 6–25, usually a dozen or more, flexuous and more or less spreading, 5–15 cm. long, commonly more than 10 cm.: spikelets, exclusive of the awns, about 3 mm. long: scales 6; outer empty ones acuminate, the first scale about three fourths as long as the second (which is about 3 mm. long) and broader; third scale, with the callus short-pilose, about 2.25 mm. long, in side view inequilaterally elliptic and about .75 mm. wide, the nearly straight midnerve much less curved than the lateral nerves, all the nerves pilose, the midnerve to above the middle with hairs about .5 mm. long, the lateral nerves from below the middle to the apex with intermixed hairs of irregular length 2–3 mm. long, the hairs extending much beyond the apex of the scale, the brown awn inserted just below the summit, 3–4 mm. long, the palet about as long as the scale; fourth scale about 1.3 mm. long, in side view obovate-elliptic and about .5 mm. wide, obliquely truncate at the crenulate apex, the brown awn inserted just below the summit, 2.5–3 mm. long; fifth scale triangular, a little more than one half as long as the fourth; sixth scale about one half as long as the fifth; grain elliptic, about 1 mm. long.

South peninsular Florida. Also in the West Indies and South America. Collected in this country, so far as indicated by the material at our disposal, only by Mr. J. H. Simpson.

A word in regard to the history of the name of this plant may be of interest. Linnaeus in the Amoenitates Academicae,* in an article on the plants of Jamaica, published an *Andropogon barbatum*

*5: 412. 1759.

giving a fairly long description and the following citation: "Brown, jam. 364." We have not access to the work cited by him, but from the description there can be little doubt as to what plant he had in view. In a later work, however, he throws more light upon the subject in the publication of his *Andropogon polydactylon*,† citing as synonymous his previous publication in the Amoenitates, further elucidating the matter by again referring to "Brown, jam. 364," and adding a positive means of identification in his additional reference to "Sloan, jam. 33, hist. 1, p. 111, t. 65, f. 2." This plate and description have been seen by us, and there is no doubt as to the figure representing what has long been called *Chloris polydactylon* Sw., the long leaves and the elongated flexuous spikes, characteristic of this species, being well indicated.

An examination of the above facts will show that Linnaeus included in the publication of his *Andropogon polydactylon* a reference to his previous publication of *Andropogon barbatum*, with its reference to the work on Jamaica by Brown, thus fully establishing the fact of the identity of the two plants, and as confirmatory evidence offers the plate in Sloan's History of Jamaica which, as stated above, well represents the *Chloris polydactyla* Sw. It would seem from this that a clear case is established for the adoption of the name *barbatum* for this species, as it antedates the other by four years.

Just why Linnaeus should have proceeded in this apparently careless manner is not clear. A hint as to where he secured the name *polydactylon* is given in the words he cites in the second edition of his Species Plantarum: "Andropogon polydactylon assurgens, spicis tenuioribus hirsutis. Brown, jam. 364." Why he should thus ignore the earlier publication of *Andropogon barbatum* and substitute for the specific name that of *polydactylon*, we must repeat, is not clear. Possibly he thought that *polydactylon* was a better descriptive term, as the numerous long spikes of the plant are very striking.

Subsequent to the publication of his *Andropogon polydactylon*, Linnaeus again published an *Andropogon barbatum*,* giving its

† Sp. Pl. Ed. 2: 1483. 1763.
* Mant. 302. 1767.

habitat as the East Indies, but making no reference whatever to the publication of his first species of this name. This, of course, makes this subsequently published name a homonym, and necessitates securing another name for the East Indian plant, a result which can probably be attained by delving among the mass of little understood names in this genus.

9. CHLORIS ELEGANS H.B.K. Nov. Gen. & Sp. Pl. 1 : 166, *pl.* 49. 1815.

Culms 1.5–9 dm. tall, compressed, erect, finally branched; nodes 2–4 : culm leaves 2–4 ; sheaths compressed, keeled, much shorter than the internodes, loosely embracing the culm, the uppermost one much enlarged at the time of protrusion of the inflorescence ; ligule a scarious ciliolate ring 1 mm. or less wide ; blades 1–20 cm. long, usually less than 10 cm., 2–6 mm. wide, erect or ascending, smooth beneath, usually very rough above : inflorescence yellowish or silvery white, often tinged with purple, consisting of 3–12, commonly 8–10, erect spikes, 2–8 cm. long : spikelets, exclusive of the awns, about 4 mm. long, long-hairy at the base : scales 4, or occasionally 5 ; outer empty ones lanceolate, often purplish, acuminate, the first scale about three fifths as long as the second which is about 3 mm. long and bears just below the apex an awn about 1 mm. long ; third scale, exclusive of the awn, 3–3.5 mm. long, pilose on the callus, in side view equilateral and about 1 mm. wide, the midnerve abruptly contracted a short distance below the awn, glabrous or more or less pilose with short hairs except at the summit, the marginal nerves nearly equally curved, short pilose below the middle, long pilose at the summit with erect hairs 2.5–3 mm. long, which much exceed the apex of the scale, the internerves below the middle and near the midnerve sometimes sparingly appressed-pubescent, the awn inserted just below the summit, 5–10 mm. long, the palet about as long as the scale ; fourth scale 1.5–2.5 mm. long, in side view about .6 mm. wide and obcuneate to oblong-cuneate, obliquely truncate at the apex, the midnerve nearly straight or a little curved, the lateral nerves curved from about the middle to the apex, the awn inserted just below the summit, 3–7 mm. long ; fifth scale, when present, triangular, less than 1 mm. long : seed elliptic, 1.75 mm. long.

Sandy soil. Texas to Arizona, south to Central America.

The following, among many specimens examined, are to be referred here :

New Mexico : C. Wright, 1851–2, nos. 2026 and 2027.

Arizona: J. T. Rothrock, 1874, no. 578. Gardiner's Spring, C. G. Pringle, June 24, 1882. Fort Huachuca, T. E. Wilcox, 1891, no. 79. Tucson, J. W. Toumey, Aug. 25, 1891, no. 150. *Mexico:* Chihuahua, C. G. Pringle, Sept. 20, 1885, no. 474.

10. CHLORIS PRIEURI Kth. Enum. Pl. **1**: 266. 1833.

Culms 4–10 dm. tall, at first erect, finally decumbent at the base and rooting at the lower nodes; nodes 4–6: culm leaves 4–6; sheaths shorter than the internodes, keeled, at least toward the summit, smooth, papillose-hirsute on both margins at the summit, otherwise glabrous; ligule a scarious ciliolate ring, about .5 mm. broad; blades 1.5 dm. or less long, 3–6 mm. wide, smooth beneath, rough above and on the margins, the upper surface papillose-hirsute toward the base with long hairs: inflorescence at length exserted; spikes 4–15, 6–9 cm. long, erect, the rachis strongly hispid, especially on the angles: spikelets, exclusive of the awns, about 4 mm. long: scales 7–9, the upper ones much the smaller, the uppermost scale often reduced to a mere awn; outer empty scales acuminate, awn-pointed, the first about one half as long as the second, which is 2.5–3 mm. long; third scale, exclusive of the awn, 3–3.5 mm. long, in side view narrowly oblong and about .5 mm. broad, acute, the callus short-pilose, a row of dark glands on each side of the glabrous midnerve, the lateral nerves glabrous below the middle, pilose above, the hairs increasing in length toward the summit, where they are about 1 mm. long, the awn inserted just below the apex, 8–15 mm. long, the palet shorter than the scale, gland-bearing between the nerves; remainder of the scales much reduced in size, sometimes mere rudiments, the awns successively shorter.

Introduced at Wilmington, N. C., and on ballast at Mobile, Ala., collected at the former place by Mr. G. McCarthy, and at the latter locality by Dr. Chas. Mohr.

EUSTACHYS Desv. Nouv. Bull. Soc. Philom. **2**: 188. 1810. [SCHULTESIA Spreng. Pl. Pugill. **2**: 17. 1815.]

Tufted perennial sometimes glaucous grasses with much compressed smooth and glabrous culms and sheaths, the former often 2-edged, the latter crowded at the base of the culm and strongly equitant, leaves flat, or, when dry, folded, obtuse, and a terminal inflorescence composed of erect or ascending 1-sided spikes, digitately arranged in 1 or occasionally in 2 whorls, or rarely reduced to 1 or 2 spikes. Spikelets alternately arranged in 2 rows on one

side of a triangular rachis and more or less divergent from it. Scales 4, or very rarely 5, the fifth rudimentary, the awns, when present, hispidulous; outer 2 scales empty, membranous, keeled. 1-nerved, the nerve hispidulous, the first scale acute or acutish, shorter than the awned second, which is broad and oblong, 2-toothed or 2-lobed, or sometimes truncate, at the apex; third scale firmer, chartaceous and deep brown or almost black at maturity, keeled, 3-nerved, the nerves pilose, awnless or bearing a mere rudimentary awn, enclosing a perfect flower and a 2-nerved palet as long as or a little shorter than the scale, the nerves ciliolate; fourth scale similar in texture to the third, awnless or rarely short-awned, rounded to truncate at the apex, which is inrolled on the margins, 3-nerved, the nerves glabrous. Stamens 3. Styles distinct; stigmas plumose. Grain free, elliptic.

Species about 10, confined to the tropics and the warmer parts of the temperate zones in America.

Key to the Species.

Spikelets 2 mm. long; third and fourth scales awnless, or the former with a mere dorsal point.

Spikes usually 4–6, rarely more; second scale of the spikelet manifestly 2-toothed at the apex; leaves usually 3–7 mm. wide. 1. *E. petraea.*

Spikes 10–25; second scale of the spikelet truncate at the apex; leaves usually 1 cm. or more wide. 2. *E. glauca.*

Spikelets 3 mm. or more long; third and fourth scales awned.

Spikes usually 1 or 2, rarely 3; third scale of the spikelet exceeding 3 mm. long. 3. *E. Floridana.*

Spikes 4–6; third scale of the spikelet less than 3 mm. long. 4. *E. neglecta.*

1. EUSTACHYS PETRAEA (Sw.) Desv. Nuov. Bull. Soc. Philom. **2**: 189. 1810.

Chloris petraea Sw. Prod. 25. 1788.

Chloris Swartziana Doell, Mart. Fl. Bras. **2**^{3}: 68. 1883.

Culms 3–11 dm. tall, much compressed, at length branched, often decumbent or prostrate at the base and rooting at the lower nodes; nodes 2–5: basal leaves crowded, culm leaves 2–4 at the lower nodes; sheaths much compressed, keeled, striate, those at the base and lower nodes equitant; ligule a scarious ciliolate ring less than .5 mm. wide; blades 3 dm. or less long, usually under 2 dm., 10 mm. or less wide, commonly 6 mm. or under, smooth on both surfaces, rough on the margins: inflorescence at length much exserted, consisting of 3–11, usually 4–6, erect or slightly spreading spikes, 4–11 cm. long: spikelets about 2 mm. long:

scales 4; outer empty ones broad, the first scale acute, from one half to three fourths as long as the second, which, exclusive of the awn, is 1.5–1.75 mm. long, oblong, more or less hispidulous on the exterior surface, 2-toothed at the apex, the teeth triangular, acute or obtusish, the awn about .5 mm. long; third scale, with the callus pilose, about 2 mm. long, in side view elliptic and about 1 mm. wide, nearly equilateral, the midnerve a little more curved than the lateral nerves, all the nerves pilose with hairs about .3 mm. long, the lateral nerves from just below the middle to the apex, the midnerve excepting at the base and the summit, the awn a mere point, or wanting, the palet about as long as the scale; fourth scale 1.3–1.5 mm. long, in side view obovate-elliptic, .5–.7 mm. wide, rounded at the apex, awnless.

Dry sandy soil, usually along the coast, North Carolina to Florida, west to Texas. Also in Cuba and the Bahamas and in Central and South America. In Florida it occurs in the heart of the peninsula, 50 miles from the coast.

The following specimens are to be referred here:

Texas: Corpus Christi, H. W. Ravenel, Apr. 30, 1869, no. 86. Hempstead, Elihu Hall, Apr. 18, 1872, no. 775.

Florida: A. H. Curtiss, Jacksonville, May, no. 3443; June 12, 1893, no. 4060; and Aug. 23, 1894, no. 4808. Eustis, Lake Co., Geo. V. Nash, March 12–31, 1894, no. 217.

Bahama Islands: Fortune Island, Eggers, no. 3860.

Cuba: C. Wright, no. 3817.

2. EUSTACHYS GLAUCA Chapm. Fl. South. U. S. 557. 1860.

Chloris glauca Vasey, Descrip. Cat. Grasses U. S. 61. 1885.

Culms 6–15 dm. tall, much compressed, sometimes sparingly branched, usually simple; nodes 2–4: basal leaves 6–12, culm leaves 2–4 at each of the nodes, excepting the uppermost one; sheaths much compressed, equitant, keeled, broadest at the base, striate; ligule a scarious ciliolate ring about .5 mm. wide; blades 2.5 dm. or less long, 1.5 cm. or less wide, linear, rounded at the apex, smooth on both surfaces, rough on the margins, the uppermost one wanting or less than 1 cm. long: inflorescence finally long-exserted, the axis 2.5 cm. or less long; spikes 10–25, erect or somewhat spreading, 6–15 cm. long: spikelets about 2 mm. long: scales 4; first scale boat-shaped, acute, about one half as long as the second, which, exclusive of the awn, is 1.5 mm. long, oblong, in side view about .3 mm. wide, minutely and irregularly toothed at the truncate apex, hispidulous on the outer sur-

face, the awn about .3 mm. long; third scale 1.75–2 mm. long, in side view about equilateral, ovate, .8–.9 mm. wide, obtuse at the awnless apex, the nerves hispid above the middle, the hairs shorter toward the apex of the scale, the palet about as long as the scale; fourth scale about 1.3 mm. long, in side view oblong and about .5 mm. wide, rounded-truncate at the awnless apex.

Brackish marshes and along cypress swamps, Florida.

The following belong here:

Jacksonville, A. H. Curtiss, Sept., no. 3444; Sept. 23, 1893, no. 4059, and Sept. 18, 1894, no. 5186. Eustis, Lake Co., Geo. V. Nash, July 1–10, 1895, no. 2139.

3. EUSTACHYS FLORIDANA Chapm. Fl. South. U. S. 557. 1860.

Chloris Floridana Vasey, Descrip. Cat. Grasses U. S. 61. 1885.

Culms 4–10 dm. tall, erect, simple, much compressed; nodes 2: culm leaves 2; sheaths much compressed, keeled, much shorter than the internodes, those at the base short and crowded, the uppermost one elongated; ligule a scarious ciliolate ring about .5 mm. broad; blades folded, at least when dry, erect, rough on the margins, smooth on both surfaces, acute, the early basal ones 1–3 dm. long, 4–8 mm. wide, those on the culm 2–7 cm. long, 5 mm. or less wide, the terminal one minute or wanting: inflorescence long-exserted, consisting of 1–3, usually 2, rarely 3, erect spikes, 5–10 cm. long: spikelets, exclusive of the awns, 3–3.5 mm. long: scales 4; first scale obtuse or acutish, about two thirds as long as the second, which is about 2.5 mm. long, exclusive of the awn, minutely pubescent on the outer surface, unequally 2-lobed at the apex, the lobes rounded and minutely and irregularly toothed, the awn .7–1 mm. long; third scale, with the callus pilose, 3–3.5 mm. long, in side view nearly equilateral and 1–1.2 mm. wide, elliptic, the midnerve with a slight depression near the apex, the marginal nerves more curved, all the nerves pubescent with ascending hairs about .5 mm. long, the lateral nerves excepting at the base, the midnerve except at the apex, the awn .5–.7 mm. long, inserted just below the apex, the palet about as long as the scale; fourth scale 1.5–2.5 mm. long, in side view nearly oblong, a little broader at the rounded-truncate summit, 1 mm. wide, 3-nerved, the awn inserted just below the apex, less than .5 mm. long: seed obtusely 3-angled, about 2.3 mm. long.

Dry sandy soil, southern Georgia and northern Florida.

The following belong here:

Georgia: Bainbridge, Chapman.

Florida: Lake City, Columbia Co., Geo. V. Nash, July 11–19, 1895, no. 2198. Chattahoochee, S. M. Tracy, Aug. 23, 1897, no. 3730.

4. EUSTACHYS NEGLECTA.

Chloris neglecta Nash, Bull. Torr. Bot. Club, **22**: 423. 1895.

Culms 7–12 dm. tall, erect, simple, much compressed; nodes 3: basal leaves 6–12, culm leaves usually 1 at each node, sometimes 2 at the lower node; sheaths much compressed, keeled, striate, the basal equitant; ligule a scarious ciliolate ring about .5 mm. broad; blades folded, at least when dry, 2 dm. or less long, 9 mm. or less wide, linear, obtuse, smooth on both surfaces, rough on the margins, the uppermost wanting or very small: inflorescence at length much exserted, the axis less than 1 cm. long; spikes 4–6, erect or slightly spreading: spikelets, exclusive of the awns, about 3 mm. long: scales 4, rarely 5; first scale obscurely 2-lobed at the apex, awn-pointed between the lobes, a little broader than, and about two thirds as long as, the second, which, exclusive of the awn, is about 2.5 mm. long, oblong, sparsely pubescent exteriorly, 2-lobed at the apex, the lobes obtuse and minutely and irregularly toothed, the awn about 1 mm. long; third scale, with the callus pilose, 2.5–2.8 mm. long, in side view about 1 mm. wide and a little inequilateral, the margin more curved than the midnerve, the nerves pilose with hairs about .7 mm. long, the lateral nerves excepting at the base, the midnerve to the base of the awn, which is about 1 mm. long, the palet slightly shorter than the scale; fourth scale 1.5–2 mm. long, in side view obovate-elliptic and about .75 mm. wide, the awn inserted below the summit, less than 1 mm. long; fifth scale, when present, triangular, less than .5 mm. long: seed 3-angled, elliptic, about 1.5 mm. long.

Dry sandy soil, east and peninsular Florida. The type of this species was collected by the writer near Orange Bend, Lake Co., in 1895, no. 2149. The greater number of spikes, the smaller spikelets, and the shorter third scale with its longer hairs at once distinguish this from the above, *E. Floridana*, to which, in general appearance, it bears much resemblance.

The following belong here:

Jacksonville, A. H. Curtiss, 1875. Duval Co., bank of St. John's river, A. Fredholm, Oct. 9, 1893, no. 319. Eustis, Lake Co., Geo. V. Nash, July 1–10, 1895, no. 2149 (the type).

New Plants from New Mexico.—III.

By E. O. Wooton.

Commelina crispa.

Much branched, perennial by tuberous roots (erect when young, lower part of stem prostrate, upper erect in age): stems often 5–8 dm. long, finely villous-pubescent above, especially on stems near the nodes, becoming glabrous below: leaves linear-lanceolate, 3–7 cm. long, 4–6 mm. wide, pubescent with small scattering hairs on both surfaces, acuminate, crispate, slightly contracted at the base; ochrea 12–15 mm. long, membranous, closed all the way up, supplied with several white bristly hairs on the margin at the mouth of its tube; spathe much the shape of that of *C. Virginica* L. but slightly shorter, a little broader and the sides more curved, 1.5–2 cm. long, 1 cm. broad, acute, decurrent into a peduncle 5–8 mm. long, pubescent and also bearing some weakly hispid rather long white hairs at the base, generally about 3-flowered: sepals all broadly elliptical-rotund, the upper one slightly narrower than the others (3 mm. long) and only about half as large: two upper petals broadly reniform, long-clawed, 1–1.5 cm. in diameter, very delicate in texture and finely veined, bright blue; claw 3–4 mm. long; third petal small, white, lanceolate, 2–3 mm. long: 3 fertile stamens with 7–9 mm. long filaments; 3 staminodia about half as long: style over 1 cm. long, loosely coiled upward: pod 3-celled and 3-seeded, glabrous, two of the cells dehiscent, the third indehiscent: seeds orbicular, slightly flattened, smooth.

Collected at the base of the Organ Mountains, Doña Ana Co., Sept. 1; altitude 4800 feet, no. 545. Much if not all the southwestern material which has been referred to *C. Virginica* belongs here. In reality this plant is more closely allied to *C. angustifolia* than to *C. Virginica*.

It is one of the common species of the Southwest, as is shown by the fact that it was collected by Pope's expedition and Marcy's and the Mexican Boundary Surveyors. Its range seems to be from the plains of western Nebraska and Kansas southward into Mexico, particularly in the arid region. I have found it growing only in loose rocky soil.

PHILADELPHUS ARGYROCALYX.

Branching shrub, 1–2 m. high, with slender branches, bark red-brown on the younger stems, shreddy on the older ones: leaves opposite, elliptical-ovate, 2–3.5 cm. long, 7–12 mm. broad, acute, contracted into a short petiole, glabrate above, appressed-pubescent and lighter green below, strongly 3-nerved, entire: flowers solitary, terminating short leafy branches, bright white, about 3 cm. in diameter: calyx-tube hemispherical, 3–5 mm. in diameter; limb 4-parted, segments ovate, acute, short-acuminate, 4–6 mm. long, the whole calyx with the peduncle densely silvery white, woolly over the outside and at the tips within; petals 4, obovate, retuse to obcordate: stamens numerous, of several lengths: anthers greenish: styles united; stigmas linear, slightly longer than styles; ovary perfectly glabrous: fruit a 4-celled coriaceous pod with numerous seeds, inclosed in the persistent woolly calyx.

Collected on Eagle Creek, in the White Mountains, Lincoln Co., Aug. 14, 1897, in fruit, no. 524, at an altitude of about 7000 feet. First collected in flower on Ruidoso Creek in the same mountains, June 30, 1895, at about the same altitude. Also collected at Fort Huachuca, Ariz., June, 1892, and July, 1893, by Dr. T. E. Wilcox.

It is most closely allied to *P. microphyllus* Gray, having about the same sized flowers and leaves, but is easily separated from that species by its calyx. In *P. microphyllus* the calyx is slightly pubescent at the base on the outside, but most of the tube and all the outside of the limb is perfectly glabrous. *P. scrpyllifolius* Gray has the woolly calyx but its flowers and leaves are not one third the size of those of *P. argyrocalyx*.

LINUM VERNALE.

Annual or biennial (?) herb, 2–3 dm. high with numerous erect stems from a whitish perpendicular root about 1 dm. long: stems slightly curved at the base, branched above, terete, slightly striate, perfectly glabrous: leaves numerous and closely imbricated on the lower part of the stems, more scattered above, 7–18 mm. long, barely 1 mm. wide at the base, linear-subulate, obscurely 1-nerved, glabrous, bluish-green, lower entire, upper glandular-dentate; stipular glands very small and blackish: flowers numerous, borne on pedicels 5–15 mm. long and apparently opposite the leaves: sepals rather broadly lanceolate, 5–7 mm. long, 1.5–2 mm. wide, scarious-margined and glandular-dentate with numerous fine teeth,

subaristate, with one prominent central vein and two lateral ones, persistent in fruit: petals broadly obovate-cuneate, 12–15 mm. long, 10–12 mm. broad, golden yellow, with a brownish-red blotch at the base forming an "eye" to the flower, early deciduous and very delicate: stamens slightly shorter than the 7 mm. long almost completely united styles: capsule a little shorter than the sepals, ovoid; callus at base of proper septa very small, false septa hardly complete, thickened only a little at the very base.

My specimens of this plant come from a single locality—the base of a small mountain, generally called Tortugas, standing alone on the mesa about five miles east of Las Cruces, Doña Ana, Co. in dry soil. I collected it in flower Apr. 22, 1893, and several times about the same season at this place. A few specimens were taken there in fruit July 1, 1897, no. 589.

Thurber's no. 561 from El Paso, Texas, in bloom April, 1851, and labeled *L. rigidum* Pursh., M. E. Jones' no. 3721 from El Paso, Texas, April 17, 1884, also in flower and labeled *L. Boottii*. Planchon, as well as some Mexican Boundary specimens without data but labeled *L. Berlandieri* Hook., are all to be referred here

The flowers and habit show our plant to be related to *L. Berlandieri* and *L. multicaule*. It is separated from the former by narrow leaves, smaller and more numerous flowers, persistent sepals and very slightly thickened false septa. From *L. multicaule* it is distinguished by a more erect habit, more numerous flowers, leaves not crowded above, plant glabrous throughout and sepals glandular-dentate.

Our plant has possibly been included with *L. aristatum* Engelm. but can hardly belong there if Dr. Engelman's description of the plant is to be relied upon for our plant is rarely one foot high, has flowers which are not at all sulphur yellow and sepals which surpass the pod but a very little.

The fact that our plant seems to bloom in the spring, a season at which the other species of the genus of that section are not likely to be in flower, has been of especial interest and attention is called to the fact in the name now proposed.

MARTYNIA PARVIFLORA.

Coarse, rank-scented clammy viscid annual: stems decumbent, ascending at the ends, 1 m. or more long, branching at the base,

very viscid-glandular: leaves opposite, broadly ovate in general outline, obscurely 5-lobed, cordate, coarsely sinuate, obtuse; petiole 7–15 cm. long; blade in young plants 5–8 cm. long, 4–6 cm. broad, in well-developed plants the largest leaves frequently 2 dm. long and three-fourths as broad: flowers in racemes which are borne in the angle between the dichotomous branches; pedicels 1–2 cm. long, becoming longer and stouter and strongly reflexed in fruit: calyx bibracteolate, unequally 5-lobed, cleft to the base on the outer side, the inner segment being narrowest and longest, 12–14 mm. long, lobes rather obtuse, narrowly ovate to lanceolate, strongly veined and very glandular; bracts oblong-lanceolate, 6–7 mm. long: corolla constricted at the base, gaping though not so widely as in other southwestern species, 2.5–3 cm. long, dull cream yellow with a large purple blotch in upper side of the throat and spreading over the two upper lobes, 5-lobed, the upper and lateral reflexed, entire to repand; tube glandular-pubescent over the entire outside and somewhat so within the throat: stamens didynamous, the rudiment of the fifth only 1 mm. long; filaments glabrous except at the base where they are finely glandular: ovary finely glandular; style longer than the stamens; pistil 2-parted: fruit as in the nearly related species, 1 dm. long, including the strongly incurved beak, very glandular-viscid without, endocarp tough, woody; seeds irregularly flattened by crowding, 6–8 mm. long, black.

Collected at San Augustine Ranch at the base of the Organ Mountains, Doña Ana Co., August 30th; altitude 4500 feet, no. 580. I also collected it at Las Cruces, August 23, 1895. Thurber's no. 913 from Sonora, Mexico, September, 1851, and same number from Corralitas, Chihuahua, Mexico, August, 1852, should be referred here, as well as Dr. Mearns' no. 215 from Fort Verde, Arizona, September 14, 1887, and Wright's no. 429 (in Columbia Herbarium) without locality but probably from some place in Texas or Chihuahua near El Paso. This plant has been referred generally to *M. fragrans* Lindl. but it is easily separated from that species by its smaller, dull colored and less gaping corolla and narrower calyx-segments. I have confused it with *M. proboscidea* Glox. and it may be the plant Dr. Gray has in mind when extending the range of that species to New Mexico. Most herbarium material represent the plant but poorly, since it is only possible to press the tips of the branches with the smaller leaves or else collect only young plants which show only small leaves, thus

causing it to be considered with the smaller forms. I have seen a single well-grown plant which covered three to four square meters of ground with the tips of its stems 3–6 dm. above the ground.

ARTEMISIA MICROCEPHALA.

Perennial herb about 6 dm. high with several erect paniculately branching stems, whole plant flocculently white-tomentose: upper leaves linear- to narrowly oblong-lanceolate, 1–3 cm. long, 2–5 mm. broad, tapering both ways, entire, acute though occasionally 3-toothed at the apex, lower leaves often 3–5-lobed, 4–5 cm. long and 6–9 mm. broad: heads in a bracted terminal panicle, numerous, smaller than any in the group to which the plants belong, 3 mm. high and 2 mm. in diameter, 15–20-flowered: flowers very small, yellow, about half in each head with much reduced tubular corolla and pistillate, the others hermaphrodite and with normal tube: akenes glabrous and without pappus, about 1 mm. long.

Collected in the Organ Mountains, Doña Ana Co., September 1, no. 504, at an altitude of about 4800 feet and distributed as *A. gnaphalodes* Nutt. Also collected at Albuquerque, N. Mex., in the fall of 1894 by President C. L. Herrick of the New Mexico State University. These plants agree exactly with the specimen of Wright's no. 1276 in the Columbia Herbarium referred to by Dr. Gray as "a small leaved and very canescent form like Wright's no. 391"* but without giving locality of collection. It is probably from the mountains of southern New Mexico.

This plant is most nearly related to *A. gnaphalodes* Nutt. from which it may easily be separated by its more slender habit and its much smaller leaves and heads of flowers.

The following described plants, all but two of which are from New Mexico, may properly be published along with those preceding although not collected on the trip referred to above. The two Arizona plants will probably be found in New Mexico when all her plants are known.

SOPHIA OCHROLEUCA.

Erect branching annual herb 5–7 dm. high, the whole plant except the flowers and fruit finely tomentulose with soft branching hairs giving it a greenish-gray color: leaves alternate, 5–13 cm. long, 1.5–3 cm. broad, oblong in outline, tri-quadripinnate, ulti-

* Pl. Wright. 2: 98.

mate segments small, 2–4 mm. long and half as broad, oblong-elliptic, obtuse: flowers in terminal racemes: sepals oblong, obtuse, purplish tinged without, glabrous, 1.5–2 mm. long: petals elliptic, short-clawed, 2.5–3 mm. long, cream white, sometimes a little purplish tinged: stamens tetradynamous, the longer of the length of the petals: ovary in flowers just opening oblong-cylindric as long as the stamens: stigma sessile: silique terete, 8–10 mm. long, tapering at base, obtuse, glabrous, valves strongly 1-nerved, replum very thin; seeds in two rows in each cell, elliptical, yellow; pedicels slightly shorter than the pod, ascending, the pod and pedicel in the same straight line making an angle of about 35 degrees with the rachis.

Collected at Mesilla Park, New Mexico, in April, 1897, by Prof. J. D. Tinsley.

This plant has no doubt been confused with various other western plants which have gone as *Sisymbrium canescens* Nutt., though I find no material of the species in the herbarium of Columbia University. It is easily separated from all other related species by the color of the flowers alone. From *S. pinnata* (Walt.) Britton it may be separated by its short ascending pedicels and pods and larger and more dissected leaves; from *S. Hartwegiana* (Fourn.) Greene by its much more dissected leaves with elliptical segments and its stouter more obtuse pods.

PROSOPIS VELUTINA.

Spiny shrub (?) generally somewhat resembling *P. glandulosa* Torr.: stems terete, brownish, young parts velutinous; stipular spines stout, not very numerous, 1–2 cm. long: leaves fascicled; petiole 1–5 cm. long; pinnae 1–2 pairs, about half the leaves having two pairs; leaflets 12–19 pairs, elliptic-oblong, 7–10 mm. long, 2–4 mm. broad, obtuse, crowded, coriaceous, strongly veined, the whole leaf being finely velutinous even in age; stipules small, subulate, yellow: flowers greenish-yellow, in cylindrical spikes 5–10 cm. long: calyx campanulate with 5 very short teeth, ciliate: petals 5, oblong, obtuse, very strongly ciliate within: stamens 10, distinct, exserted: pistil simple: fruit a stipitate pod, linear, 10–15 cm. long, flattened and compressed between the seeds, straight or falcate, very velutinous when young and pubescent even in age, indehiscent.

Probably first collected with young fruit in the valley of Nazas in northern (?) Mexico by Gregg, May 10, 1847, and labeled "Bolsonde Mapimi."

Collected also by Schott "between the Colorado and Santa Cruz River, Sonora," some time in the early fifties. Pringle's plants collected in Arizona on mesas and in valleys in flower, Apr. 23, 1881, and in fruit, August 3, 1884, belong here as well as the specimen collected by Dr. Wilcox at Fort Huachuca, Ariz., May, 1892.

The plant is of course closely related to *Prosopis glandulosa* Torr. but is easily distinguished from that species by its velvety pubescence on the leaves, fruit and all young parts and by the leaves with frequently two pairs of pinnae and small crowded leaflets.

PARRYELLA ROTUNDATA.

Low shrub, 6 dm. high or more, branching at the ground and spreading, young parts canescent, with appressed rather coarse white hairs, numerous sessile brown glands on all parts: leaves alternate, narrow, 10–12 cm. long, 7–10 mm. wide; leaflets about 25 pairs, broadly elliptical to rotund, obtuse or retuse, 1–6 mm. in longest diameter, the largest leaflets near the middle of the rachis, those at the tip exceedingly small; proper petiole short, only 3–5 mm. long; stipules about as long, narrowly lanceolate, deciduous: flowers inconspicuous in short terminal almost sessile crowded spikes, 1–2 cm. long, generally rather closely resembling the flowers of the other known species: bracts linear, two-thirds as long as calyx; calyx-tube angular, turbinate, very canescent and glandular, 2–3 mm. long; limb 5-parted, segments triangular, acute, densely hirsutulose within: corolla wanting: stamens 10, free, exserted, of unequal length; anthers similar: ovary elliptical, two-ovuled, and with the 4–5 mm. long style sparingly hirsute: fruit unknown.

Collected at a point about five miles north of Winslow, Ariz., June 29, 1892, in reddish soil.

It is easily separated from the only other known species of the genus by its rounded leaflets and its very glandular calyx. The exact size of the shrub will probably need correction, since I only saw one poorly developed individual.

PHACELIA INTERMEDIA.

Erect, branching, viscid, glandular and slightly hispidulous annual, 1–3 dm. high (generally about 1.5 to 2 dm.): stems terete, reddish tinged, quite glandular with a fine puberulence next the

stem and with scattering to thickly set hispidulous white hairs over the surface, the latter thicker on the inflorescence: leaves oblong-lanceolate in outline, 3–14 cm. long and .5–2 cm. broad, obtuse, crenately lobed and lobes coarsely crenate-toothed, short-petioled: flowers in terminal compound coiled helicoid cyme which uncoils as the fruit is produced; main peduncle 2–8 cm. long; pedicels 1 mm. long: sepals 5, spatulate, obtuse, 3 mm. long, very glandular and hispidulous: corolla funnelform, 5–6 mm. long, bright violet, lobes obovate-elliptical, subentire, spreading appendages at base of stamens attached for full length on side away from filament and for lower half their length on the other side to the base of filament and to each other, tips free, not enclosing the base of filament: stamens and pistil half as long again as corolla and exserted; style divided two thirds of its length, its base and the top of the ovary hispidulous: pod globose, slightly longer than the persistent sepals: seeds 4, elliptical, 2–3 mm. long, brown, not winged but strongly concave with a prominent ridge running lengthwise of the concave side, transversely rugose on concave side, finely pitted all over.

Collected on the mesa near Las Cruces, Doña Ana Co., N. Mex., April 10, 1893. President C. L. Herrick, of the University of New Mexico, collected the same species in the Florida Mts. near Deming, New Mexico, March 14, 1897, and in the Tres Hermanas Mts., March 20, the same year.

Dr. Rusby's plant from some place in New Mexico (label misplaced), some plants collected by Capt. E. K. Smith in Sonora (reported in the Bot. Mex. Bound. Surv. under *P. ciliata*), Wright's no. 1579 as represented in Columbia University herbarium, and Thurber's no. 11, in the same herbarium, from El Paso, March, 1851, should all be referred here. The species has been confused with *P. integrifolia* and *P. crenulata*, Dr. Gray modifying the original description of the latter species sufficiently to include it. Our plant is most like *P. crenulata* but is to be distinguished by its more numerous glands and noticeably less hispidulous character; its leaves have rounded lobes, not incised, its flowers are smaller with more nearly entire corolla-lobes and the seed is strongly transversely rugose.

ASTER (CONYZOPSIS) WOODHOUSEI.

Low spreading annual, 1 dm. high or less; stems terete, sparingly pubescent: leaves linear-oblanceolate, 1–2 cm. long, 1–3

mm. broad, sessile and somewhat clasping, obtuse, with minute hispidulous teeth along the margin, apex tipped with a short stiff hair: heads numerous, terminating short branches, 7–10 mm. high; involucral bracts fleshy, imbricated in about three rows, oblanceolate, 3–7 mm. long, 1 mm. or less broad, acute, the inner tinged purple at the tips; receptacle naked, alveolate: flowers numerous, rays fertile, in two or three rows, narrowly linear, inconspicuous, only exceeding the pappus by about 1 mm., purple (?); disk flowers narrowly tubular, expanded slightly at the top into a campanulate throat, the whole corolla shorter than and included in the sordid to tawny pappus: akenes 1–2 mm. long, slightly angled, narrowly turbinate, appressed-pubescent; pappus of numerous capillary, minutely scabrous bristles, about 6 mm. long.

First collected near the Pueblo Indian village of Zuni, in western New Mexico, by Dr. S. W. Woodhouse, in September, 1851. Again collected "in wet springs, eastern New Mexico,"* by Dr. Bigelow, in September, 1853. In the reports of both the above collections, Dr. Torrey referred the plant to *Aster angustatus* (Nutt.) T. & G. I have recently received specimens of the same plant collected by President C. L. Herrick, of the University of New Mexico, in the fall of 1894 at Albuquerque, New Mexico.

Our plant is most nearly related to *Aster frondosus* (Nutt.) T. & G., and is included in that by Dr. Gray in the Synoptical Flora. It is easily separated from that species by its decumbent habit, smaller size, smaller and less crowded heads and smaller, more pubescent leaves.

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* Pacif. R. R. Rept. 4: 97. 1856.

A New Southwestern Sophia.

By T. D. A. Cockerell.

SOPHIA HALICTORUM.

Annual; branching from the base, spreading, bushy, but not decumbent; about 40 cm. high, or often taller, whitish-green, with pubescence consisting of very short branched hairs, replaced on the green peduncles mainly by hyaline knobbed glandular hairs, so that the upper parts of the plant are not canescent: stems purple at base: leaves pinnatifid, with linear divisions: the lower leaves bipinnatifid, the divisions all linear and rather long: flowers minute, yellow: stamens considerably exceeding the petals: calyx with sparse white hairs: mature pods pinkish, 11 mm. long, their pedicels 5 or 6 mm.; seeds in two very distinct rows, bright orange, covered with minute tubercles arranged in longitudinal series: pedicels divergent or slightly ascending, and the pods 4-carinate, entirely glabrous.

Mesilla Park, New Mexico, in the zone of mesquite and *Atriplex canescens*, flowering in March and April and very abundant. It is freely visited by bees of the genus *Halictus*, whence the specific name. It occurs in dry places, also in the bottom land, but in irrigated fields it is replaced by *S. ochroleuca* Wooton, which is paler, more spreading, with yellowish-white flowers, more dissected leaves with much shorter segments, and no knobbed gland-hairs on the peduncles. In my bee-papers, I have referred to *S. halictorum* as *Sisymbrium canescens*, but it differs widely from that plant (which I was familiar with in Colorado) in its general appearance, leaves, flowers and fruit. (Compare the figures in Britton and Brown, Ill. Fl. **2**: 145.) In some respects it more resembles *S. Hartwegiana*, but the segments of the leaves are longer and the pedicels are conspicuously divergent. The flower is most like that of *S. Hartwegiana*, but the seeds are always conspicuously in two rows.

Mesilla Park, N. M.,
May 7, 1898.

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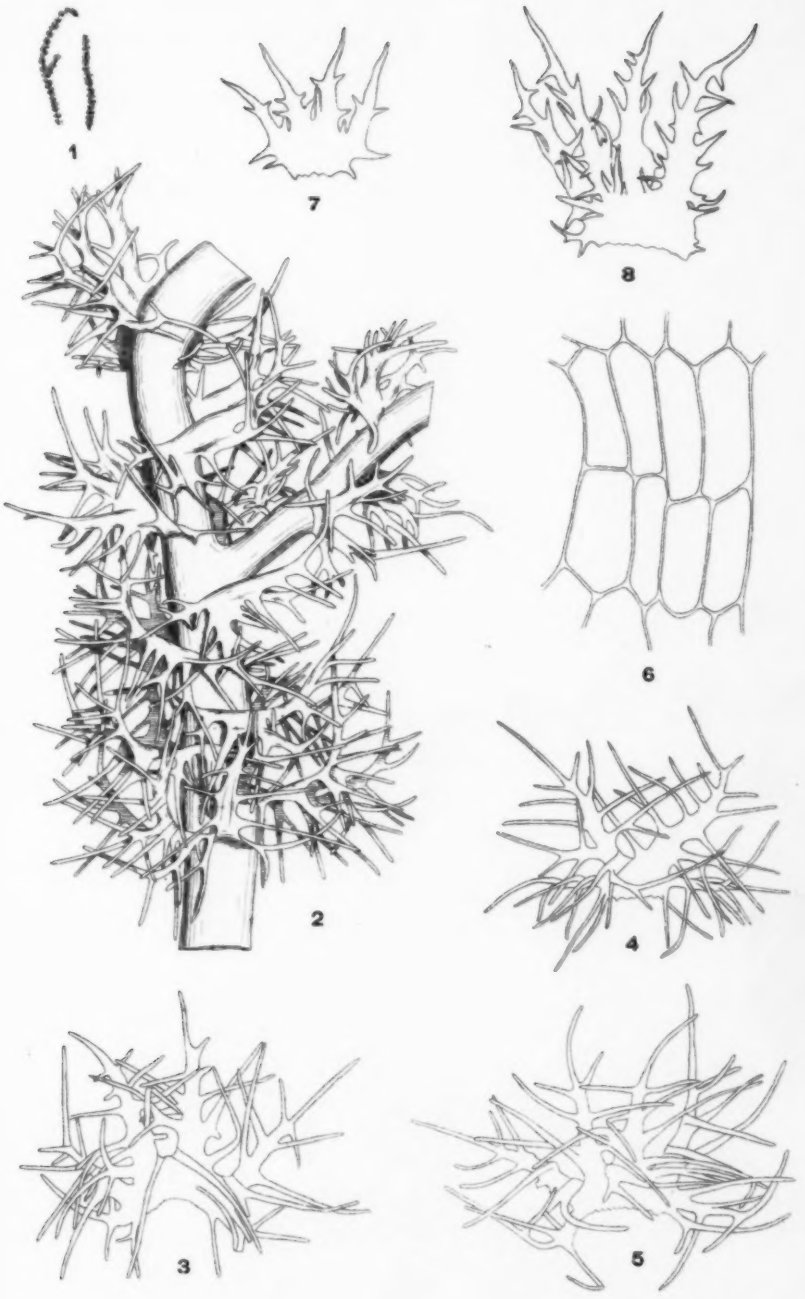

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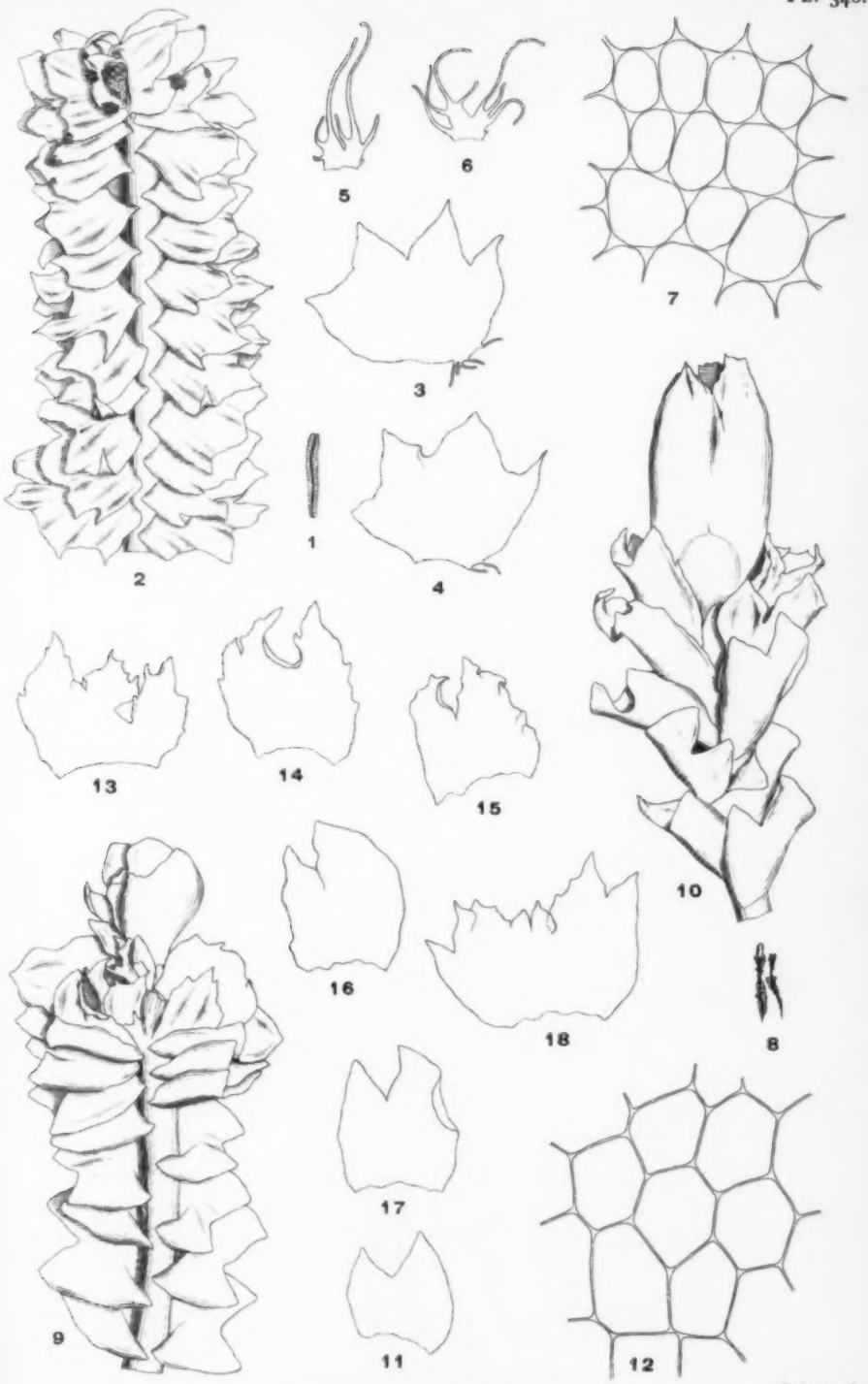

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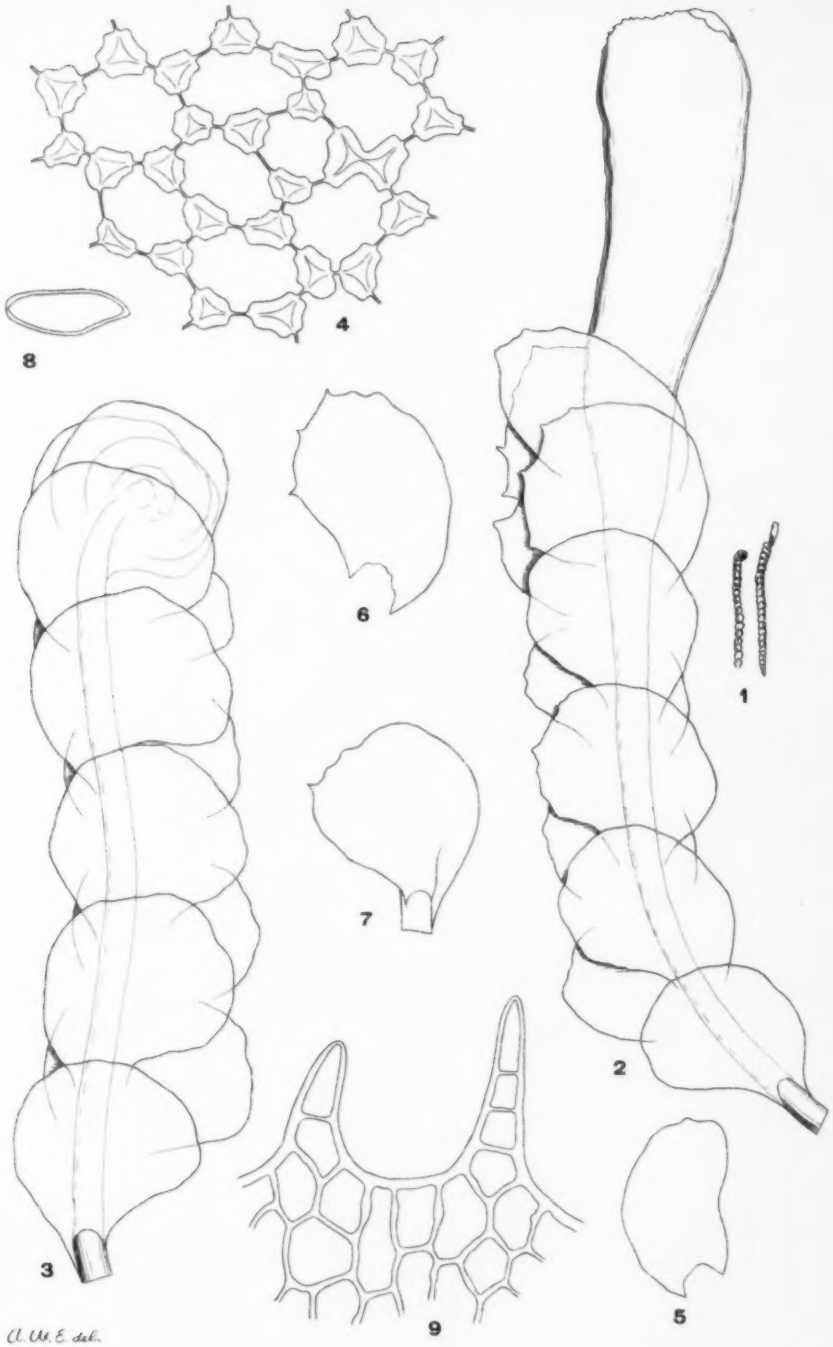

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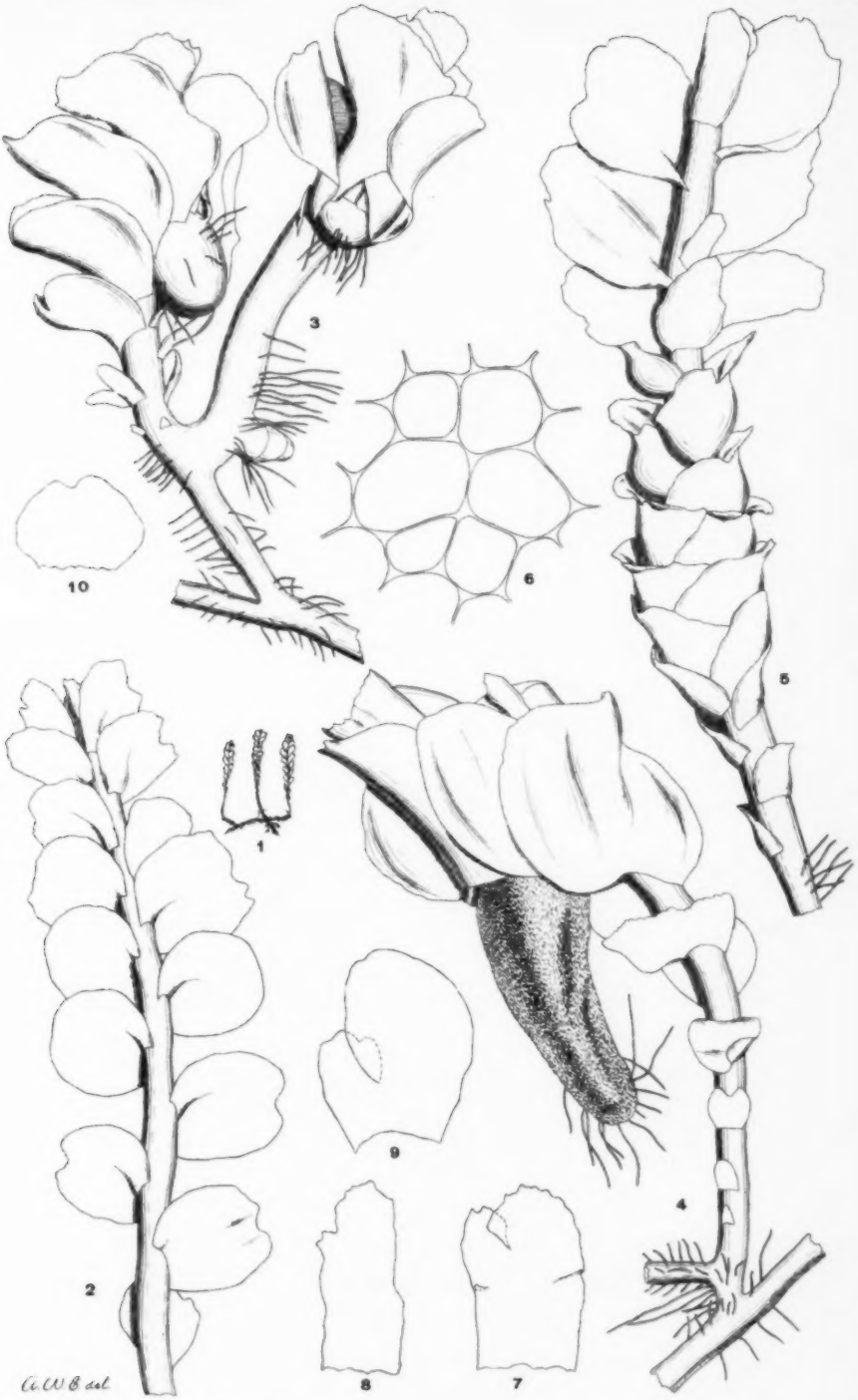

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